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Anthophilous insect community and plant-pollinator interactions on Amami Islands in the Ryukyu Archipelago, Japan

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ABSTRACT Amami Islands, located in the northern part of the Ryukyu Archipelago, are endowed with subtropical climate and rich flora and fauna containing many endemic taxa. In various types of vegetation on the islands, such as *Castanopsis*-dominated lowland forests, *Symplocos*-dominated mountain forests, mangrove forests, coastal scrub and grassland, I surveyed the flowering phenology and anthophilous insect communities of 164 plant species from 1996 to 1999. Flowering was observed throughout the year, and peaked twice in March and July. A total of 2210 individuals of 610 species in 12 orders of Insecta were observed on the flowers. The most abundant order was Diptera (32% of individuals), followed by Coleoptera (28%), Hymenoptera (23%), Hemiptera (11%), Lepidoptera (4%). The bee fauna was composed of six families, 13 genera and 26 species, and characterized by dominance of small bees (e.g., *Hylaeus*, *Lasioglossum* and *Andrena*), large carpenter bees (*Xylocopa*) and long-tongued anthophorine bees (*Tetralonia* and *Amegilla*), and by absence of *Bombus*. The bee community contrasted with both the honeybee/stingless bee-dominated community in the Asian Tropics and the bumblebee-dominated community at temperate habitats. The rarity of social bees is thought to result from seasonal and annual/supra-annual variability in floral resource on the islands. I inferred the pollinators of each plant species by examining flower-visitor communities, visitor behavior, pollen attachment on visitor's body and floral morphology. Among 104 plant species examined, the most dominant pollination type was melittophily (61%), followed by myiophily (13%), unspecialized entomophily (9.6%), anemophily (6.7%), butterfly / hawkmoth-pollination (6.7%) and cantharophily (2.9%). Among melittophilous species, small-bee-pollinated species (37%) were most dominant, followed by *Xylocopa*-(21%), *Tetralonia*-(17%), megachilid-(9.5%), *Amegilla*-(7.9%) and *Colletes* /*Apis*-(6.3%) and wasp-pollinated (1.6%) species. The high proportions of those plants pollinated by long-tongued solitary bees (55.4%) contrasted with the high proportions of bumblebee-pollinated flowers on the mainland of Japan.

KEY WORDS flowering phenology / pollination / Amami / subtropical forest / bee community / *Apis* / *Xylocopa*

Introduction

Plant-pollinator mutualism is a key interaction in a terrestrial ecosystem, since most plant species constituting various vegetation types are zoophilous except canopy trees in cool temperate forests (Procter et al., 1996). Since these zoophilous plants have coevolved with specific groups of pollinators, decreases of some pollinators due to forest fragmentation, for example, may cause extinction of the symbiotic plant partners. Thus, to conserve a terrestrial ecosystem, it is important to conserve this plant-

pollinator mutualism. However, information on pollinator communities is generally still imperfect compared with plant communities of various vegetation types around the world.

In Japan, plant-pollinator interactions have been described at various vegetation types: alpine meadows (Yumoto, 1986), subalpine forests and meadows (Kato et al., 1993), temperate deciduous forests (Kato et al., 1990; Inoue et al., 1990; Kakutani et al., 1990; Kato et al., 1990), temperate lowland marsh (Kato and Miura, 1996) and temperate evergreen forests (Yumoto, 1987; 1988). Among diverse anthophilous insects, bees are potentially superior pollinators to the other insects. Bee communities have been observed at various locations including several islands in Japan (Fukuda et al., 1973; Sakagami and Fukuda, 1973; Go'ukon, 1992; Matsuura et al., 1972; Ikudome, 1978; Ikudome, 1992; Takahashi, 1990; Kato et al., 1999). These studies demonstrated that anthophilous insect communities varied among vegetation types, and that they were generally dominated by bumblebees and other solitary bees.

In contrast, plant-pollinator interactions have recently been observed in a tropical rain forest in Sarawak (Kato, 1995; Momose et al., 1998). In the dipterocarp forests, most canopy tree species are triggered to mass-flower under unusually cool dry weather conditions in an El Niño year (Ashton et al., 1988) or under cool cloudy weather conditions in a La Niña year (Sakai et al., 1999a, b; Yasuda et al., 1999) in response to El Niño southern oscillation (ENSO). These tropical plants are pollinated by diverse insects, birds, bats and non-flying mammals, and the anthophilous insect community is dominated by social bees, i.e., honeybees and stingless bees (Inoue et al., 1990; Momose et al., 1998).

In subtropical areas in Asia, however, plant-pollinator interactions and bee communities have not yet been studied except in an oceanic archipelago, Bonin (Ogasawara) Islands, where unique flora and unique bee community are formed by stochastic immigrations of plants and bees to the islands and by characteristic coevolution between plants and bees on the islands (Kato and Nagamasu, 1995; Kato et al, 1999). In Japan, other subtropical forests are distributed in the Ryukyu Archipelago, which had been land bridged during the Tertiary period. These islands are endowed with a subtropical climate and with rich flora and fauna containing many endemic taxa (Hatsushima, 1971), while recent human activities have affected the ecosystem and biodiversity on most of these islands. Amami Islands are located in the northern part of the Ryukyu Archipelago, and have a relatively well-conserved vegetation (Kagoshima-prefecture, 1968). To detect the characteristics of plant-pollinator interactions in subtropical forests, and to compare them with subtropical oceanic islands (i.e, Bonin Islands), I made a field survey on the reproductive biology and anthophilous insect communities of various plants on Amami Islands.

In this paper, firstly, I describe (1) the flowering phenology of various plant species, (2) whole anthophilous insect fauna, especially bee fauna, (3) phenological patterns of these anthophilous insects, and (4) anthophilous insect assemblages on respective plant species. Secondly, we infer pollination systems of respective plant

species by examining their anthophilous insect communities and their contributions to pollination. Thirdly, floral hosts are compared among dominant bee species. Finally, I compare the anthophilous insect community and pollination systems on Amami Islands with those in various vegetations of various localities, and discuss the characteristics of flower-insect relationships on the subtropical islands.

Study Site

Amami Islands are located about 300 km south of Kyushu Island (Fig. 1). The island group is composed of eight main islands, of which Amami-Ohsima Island is the largest (873.5km^2) and highest; the highest peak at Mt. Yuwan is 694 m above sea level. Amami Islands are endowed with a warm subtropical climate, and surrounded by coral reefs. The yearly mean temperature is 21.1℃ and daily minimum temperature is never decrease below 0℃ (Kagoshima-prefecture, 1968). These islands have much rainfall especially during the rainy season from May to June (Fig. 2), and the average yearly total rainfall reaches 3033mm.

Amami Islands are rich in flora; number of vascular plant species is 1250, including 32 endemic species (Hatsushima, 1979). On the islands, there are five types of natural vegetation; *Castanopsis*-dominated lowland forest, *Symplocos*-dominated mountain forest, *Kandelia*-dominated mangrove forest, *Pandanus*-dominated coastal scrub and *Vitex /Ipomoea*-dominated coastal meadow, while most parts of the islands are now converted to secondary *Castanopsis* forests or secondary *Pinus* forests.

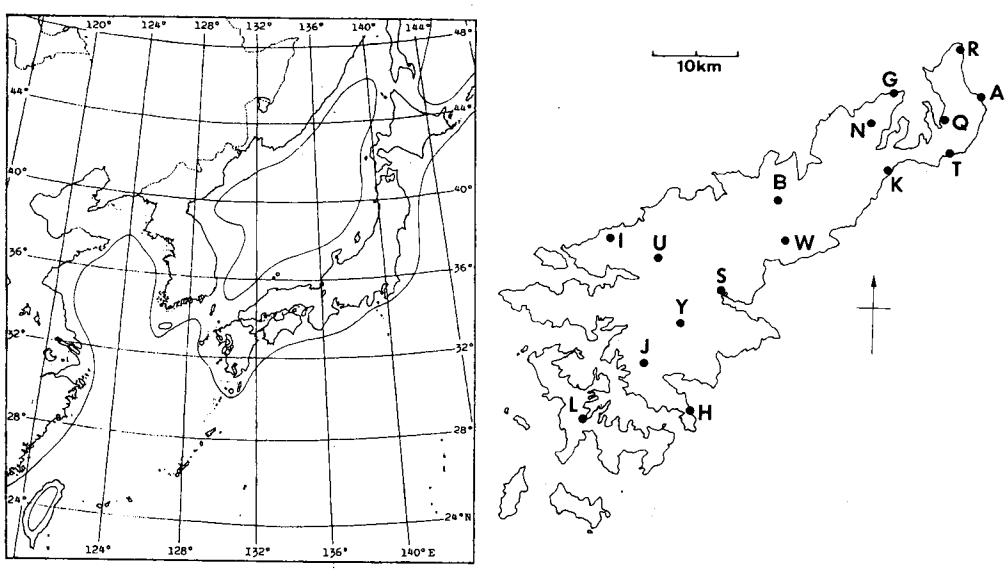

Fig. 1. The observation sites on Amami islands (right) and a map of Japan including the Ryukyu Arhipelago (left). The encircled area shows the distribution of *Bombus*.

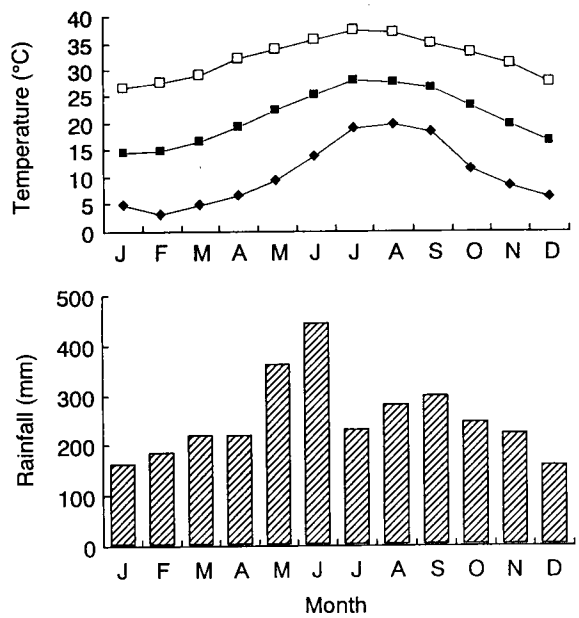

Fig. 2. Monthly changes of daily mean (solid rectangle), maximum (open rectangle) and minimum (solid diamond) temperatures (upper graph) and rainfall (mm) (lower graph) on Amami Islands (after Kagoshima Pref. 1968).

Methods

Surveys on flowering phenology and insect visits to flowers were conducted 13 times from 1996 to 1999; each survey lasted 2-4 days. These surveys covered roughly all types of vegetation on Amami-Ohshima and Kakeroma Islands (Table 1) and all seasons of the year (Table 2, Sampling dates are coded in seasonal sequence).

I started sampling of flower-visiting insects at 05:00-08:00 hr and finished at 17:00-19:00 hr. The sampling method of Kato et al. (1990) was adopted here. I walked on fixed routes in forests or meadows on the islands. When I found flowering plants, I netted flower-visitors for about 10 minutes per location. During the first 8 minutes I caught only the insects flying around and visiting the flowers, to avoid harmful effects on the flowers. During the last two minutes, I completely swept all the insects on the flowers. When I failed to net the flower visitors, the number and species of them were recorded and added to the data set. For those plant species on which insect visits were very rare, the observation time was prolonged for up to 30 minutes.

All insect specimens collected were pinned and labeled with the complete census data (date, locality and flower species visited). They were sorted and identified at the species level although some were unidentified. All the specimens have been kept at the Biological Laboratory, Yoshida College, Kyoto University.

The data set consists of each record of insect visits to flowers. Using this data set, I investigated faunal makeup of flower-visitors, phenological patterns and floral hosts of each insect group (order, family, genus or species). To detect the patterns of

Table 1. A list of study sites, with its latitudes, longitudes, altitudes, vegetation types and dominant plant genera.

Study sites	Code	Latitude	Longitude	Altitudes (m)	Vegetation types	Dominant plant genera
Kasari-cho						
Kasari-zaki	R	28°31'N	129°41'E	0-30	coastal scrub	*Cinammomum, Cycus, Litsea, Miscanthus*
Ayamaru-Misaki	A	28°28'N	129°43'E	0-5	beach meadow	*Cycas, Juniperus, Ipomoea, Pandanus*
Akagina	Q	28°27'N	129°41'E	0-90	lowland forest	*Castanopsis, Shima, Mallotus, Shefflera*
Tsuchihama	T	28°24'N	129°40'E	0-5	beach meadow and coastal scrub	*Pandanus, Thuarea, Crepidiastrum*
Tatsugo-cho						
Angyaba	G	28°28'N	129°37'E	0-5	coastal scrub	*Vitex, Ipomoea, Cycas, Musa*
Kashiken	K	28°24'N	129°37'E	0-20	coastal scrub	*Scaevora, Pandanus, Hibiscus, Wedelia*
Nagakumo-toge	N	28°26'N	129°35'E	100-300	lowland forest	*Castanopsis, Persea, Elaeocarpus, Mallotus*
Naze-shi						
Kinsakubaru	B	28°20'N	129°28'E	60-320	lowland forest	*Castanopsis, Persea, Elaeocarpus, Turpinia*
Yamato-son						
Imasato	I	28°19'N	129°17'E	0-100	lowland forest	*Schima, Castanopsis, Mallotus*
Sumiyo-son						
from Sumiyo to Kamiya	S	28°15'N	129°24'E	0-140	mangrove and lowland forest	*Kandelia, Heritiera, Castanopsis, Ardisia*
Wase-toge	W	28°18'N	129°29'E	250-300	lowland forest	*Castanopsis, Myrsine, Symplocos, Shima*
Yakkachi	Y	28°13'N	129°22'E	20-60	lowland forest	*Castanopsis, Persea, Elaeocarpus, Schima*
Uken-son						
Yuwan-dake	U	28°17'N	129°19'E	100-694	mountain forest	*Symplocos, Myrsine, Distylium, Elaeocarpus*
Setouchi-cho						
Honohoshi	H	28°8'N	129°23'E	0-5	beach meadow	*Rhaphiolepis, Aster, Cirsium, Pittosporum*
Yui-dake	J	28°11'N	129°19'E	360-482	mountain forest	*Castanopsis, Myrsine, Distylium, Elaeocarpus*
Sesou, Kakeroma-jima	L	28°8'N	129°14'E	0-30	coastal scrub and lowland forest	*Hibiscus, Pandanus, Pittosporum, Pinus*

Table 2. Observation dates and sites, and numbers of flowering plant species and of collected/observed insects on flowers. See Table 1 for codes of observation sites.

Code	Date	Observation sites	No. of flowering plant species	No. of collected insects
1	16-18 Feb. 1999	B, N, U, Y	8	21
2	18-19 Mar. 1997	B, H, J, T	37	310
3	15-18 Apr. 1995	B, N, S	24	380
4	7-8 May 1997	N, Q	17	48
5	25-28 May 1998	A, N, Q	20	7
6	29 May-1 Jun. 1999	B, K, R, S, Y	28	232
7	1-4 Jun. 1996	N, S, T	26	338
8	29 Jun.-1 Jul. 1996	I, K, N, S, U, Y	40	328
9	3-5 Jul. 1999	B, I, Q, U, Y	27	130
10	6-8 Aug. 1996	B, Q, K, N, S, W	26	215
11	5-6 Oct. 1996	B, K, N, S	24	101
12	10-12 Dec. 1996	K, N, T	14	69
13	12-15 Dec. 1997	J, L, N, Q, W	10	29

anthophilous insect communities on different plant species, the principal component and cluster analyses on the data set were conducted. In these analyses, insect visitors were grouped into 16 taxonomic groups; hemipterans, beetles, small bees, *Apis/Colletes*, megachilids, *Amegilla*, *Tetralonia*, *Xylocopa*, other hymeopterans (mainly wasps), syrphid flies, calyptrate flies, other flies (mainly small flies), butterflies, hawkmoths, other moths and other orders. In this analysis, only the plant species that received more than seven insect's visits were included. The statistical analyses on the data set were made by the SAS package in the Data Processing Center, Kyoto University.

Results

1. *Studied plants*

At 16 sites on Amami Islands (Table 1), I observed flowering of 164 plant species (75 families, 140 genera); eight annuals (4.9%), 50 perennials (30.0%), 23 shrubs (14%), 70 trees (43%) and 13 lianas (7.9%) (Table 3). These plant species consist of 130 hermaphrodites (79.3%), 22 dioecious (13.4%) and 12 monoecious (7.3%), while eight *Ficus* species were not included in this study. Four plant species, *Anagallis arvensis*, *Melilotus officinalis*, *Ageratum houstonianum* and *Bidens pilosa* var. *radiata*, were naturalized plants, and two, *Brassica campestris* and *Musa balbisiana*, were cultivated, while the other 158 species were native.

The commonest flower color was white (40.9%), followed by green (13.4%), yellow (11.6%), cream (11.0%), pink (7.9%), purple (7.9%), white with red markings (3.0%), blue (1.8%) and orange (1.2%). For flower symmetry, 82.9% of the total species were actinomorphic, and other 17.1% were zygomorphic. The commonest shape of flowers was open regular (40.2%), followed by tubular (15.9%), rotate (12.8%), apetalous (12.8%), head (6.7%), cup / bell-shaped (5.5%), papilionaceous (3.7%), funnelform (1.8%) and brush-shaped (0.6%).

Table 3. A list of plants studied for phenology and flower-visitors, with months when blooming, growth habit, naivity, breeding system, flower color, flower symmetry, flower morphology, number of observe insects on flowers, cluster detected by analysis on flower visitor spectra, and pollination agent determined.

Class Order Family	Family code	Species	Japanese name	MB	GH	N	BS	FC	FS	FM	NV	CL	PA
Cycadopsida													
Cycadales													
Cycadaceae	Cyc1	*Cycas revoluta*	Sotetsu	V	s	n	d	y	a	a	0	–	wind
Coniferopsida													
Coniferales													
Pinaceae	Pin1	*Pinus luchuensis*	Ryuukyuumatsu	II	t	n	m	c	a	a	2	–	wind
Magnoliidae													
Laurales													
Lauraceae	Lau1	*Cinnamomum doederleinii*	Shibanikkei	VI	t	n	h	c	a	o	22	C9	small bee
	Lau2	*Litsea japonica*	Hamabiwa	X	t	n	d	c	a	o	14	C9	small fly
	Lau3	*Litsea citriodora*	Aomoji	III	t	n	d	c	a	o	4	–	?
	Lau4	*Machilus thunbergii*	Tabu	III	t	n	h	c	a	o	41	C9	small fly
Piperales													
Chloranthaceae	Chl1	*Sarcandra glabra*	Senryou	VI	s	n	h	w	a	a	0	–	?
Piperaceae	Pip1	*Piper kadzura*	Fuutoukazura	V	l	n	h	w	a	a	3	C9	small fly
Ranunculidae													
Ranunculales													
Ranunculaceae	Ran1	*Clematis grata var. ryukyuensis*	Ryuukyuubotanzuru	X	l	n	h	w	a	o	1	–	small bee
	Ran2	*Clematis terniflora*	Senninsou	V-VI	l	n	h	w	a	o	16	C12	small bee
	Ran3	*Ranunculus sieboldii*	Shimakitsunenobotan	V-X	p	n	h	y	a	o	3	–	small bee
Lardizabalaceae	Lar1	*Stauntonia hexaphylla*	Mube	III-IV	l	n	h	w	a	o	7	C1	beetle
Menispermaceae	Men1	*Stephania japonica*	Hasunohakazura	VII	l	n	h	g	a	o	0	–	?
Sabiaceae	Sab1	*Meliosma oldhamii*	Fushinohaawabuki	VI	t	n	h	c	a	o	112	–	?
	Sab2	*Meliosma rigida*	Yamabiwa	IV	t	n	h	c	a	o	0	C9	small bee
Hamamelidae													
Daphniphyllales													
Daphniphyllaceae	Dap1	*Daphniphyllum macropodum*	Himeyuzuriha	III,VI	t	n	d	g	a	a	0	–	wind
Urticales													
Ulmaceae	Ulm1	*Trema orientalis*	Urajiroenoki	V-VI	t	n	d	g	a	a	16	C1	various insects
Urticaceae	Urt1	*Oreocnide pedunculata*	Hadonoki	III	s	n	d	g	a	a	0	–	wind
	Urt2	*Debregeasia edulis*	Yanagiichigo	II	s	n	d	g	a	a	0	–	wind

Fagales													
Fagaceae	Fag1	*Castanopsis sieboldii subsp. leutchuensis*	Okinawajii	III-IV	t	n	h	y	a	a	238	C12	small bee
Caryophyllidae													
Caryophyllales													
Chenopodiaceae	Che1	*Salsola komarovii*	Okahijiki	XII	a	n	h	h	a	a	1	–	wind?
Polygonales													
Polygonaceae	Pol1	*Persicaria chinensis*	Tsurusoba	V-XII	p	n	h	pk	a	o	6	–	small fly
	Pol2	*Reynoutria japonica*	Itadori	X	p	n	h	w	a	o	11	C12	small bee
Dilleniidae													
Theales													
Theaceae	The1	*Schima wallichii*	Iju	V-VI	t	n	h	w	a	r	78	C12	*Xylocopa*
	The2	*Eurya japonica*	Hisakaki	XII-II	t	n	d	c	a	o	1	–	beetle
	The3	*Eurya oshimensis*	Amamihisakaki	XII	t	n	d	c	a	o	0	–	?
	The4	*Cleyera japonica*	Sakaki	V	t	n	h	w	a	o	0	–	?
	The5	*Camellia lutchuensis*	Himesazanka	XII	t	n	h	w	a	o	0	–	?
Actinidiaceae	Act1	*Actinidia rufa*	Shimasarunashi	V	l	n	m	w	a	r	1	–	*Xylocopa*
Clusiaceae	Cul1	*Garcinia subelliptica*	Fukugi	VI	t	n	d	w	a	o	0	–	?
Malvales													
Elaeocarpaceae	Ela1	*Elaeocarpus japonicus*	Kobanmochi	IV	t	n	h	w	a	o	67	C9	small bee
	Ela2	*Elaeocarpus sylvestris var. ellipticus*	Horutonoki	VI	t	n	h	pk	a	o	35	C1	small bee
Sterculiaceae	Ste1	*Heritiera littoralis*	Sakishimasuou	V-VI	t	n	m	pl	a	o	55	C1	?
Malvaceae	Mal1	*Hibiscus hamabo*	Hamabou	VI-VII	t	n	h	y	a	r	3	C13	megachilid
	Mal2	*Hibiscus makinoi*	Sakishimafuyou	X-XII	t	n	h	pk	a	r	11	C3	*Xylocopa*
	Mal3	*Hibiscus tiliaceus*	Oohamabou	VI-XII	t	n	h	y	a	r	4	C13	megachilid
	Mal4	*Sida rhombifolia*	Kingojika	X	p	n	h	y	a	r	0	–	?
	Mal5	*Urena lobata var. tomentosa*	Oobabontenka	X-XII	p	n	h	pk	a	r	0	–	?
Lecythidales													
Lecythidaceae	Lec1	*Barringtonia racemosa*	Sagaribana	XIII	t	n	h	w	a	b	1	C5	hawkmoth
Violales													
Stachyuraceae	Stc1	*Stachyurus praecox var. lancifolius*	Nanbankibushi	III	t	n	h	c	a	c	0	–	?
Violaceae	Vio1	*Viola pseudo-japonica*	Ryuukyuukosumire	II-III	p	n	h	pl	z	t	1	C14	*Tetralonia*
Cucurbitaceae	Cuc1	*Melothria liukiuensis*	Kurominosuzumeuri	XII	l	n	h	g	a	o	1	–	beetle?
	Cuc2	*Trichosanthes miyagii*	Ryuukuukarasuuri	X	l	n	h	w	a	t	2	–	?
Capparales													
Brassicaceae	Bra1	*Brassica campestris*	Aburana	III	a	c	h	y	a	r	11	C8	*Apis*
	Bra2	*Raphanus sativus var. raphanistroides*	Hamadaikon	III-V	a	n	h	pl	a	r	0	–	?

Ericales														
Ericaceae	Eri1	*Vaccinium bracteatum*	Shashanbo	IV	t	n	h	w	a	c	0	–	?
	Eri2	*Vaccinium wrightii*	Giima	IV-V	t	n	h	w	a	c	2	C2	*Xylocopa*
	Eri3	*Rhododendron tashiroi*	Sakuratsutsuji	III	t	n	h	pk	a	f	1	C14	*Tetralonia*
Ebenales													
Ebenaceae	Ebe1	*Diospyrus japonica*	Rhyuukyuumamegaki	VI	t	n	d	g	a	c	8	C2	*Xylocopa*
Styracaceae	Sty1	*Styrax japonica*	Egonoki	II-IV	t	n	h	w	a	r	22	–	*Tetralonia*
Symplocaceae	Sym1	*Symplocos cochinchinensis*	Aobanoki	VIII	t	n	h	w	a	o	0	–	?
	Sym2	*Symplocos glauca*	Mimizubai	VII	t	n	h	w	a	o	0	–	?
	Sym3	*Symplocos microcalyx*	Amashiba	III-IV	t	n	h	w	a	o	56	C12	small bee
	Sym4	*Symplocos prunifolia*	Kurobai	XII	t	n	h	w	a	o	0	–	?
Primulales													
Myrsinaceae	Myr1	*Ardisia pusilla*	Tsurukouji	VI	s	n	h	w	a	o	1	–	small bee
	Myr2	*Ardisia quinquegona*	Shishiakuchi	V-VI	t	n	h	w	a	o	35	C12	*Xylocopa*
	Myr3	*Ardisia sieboldii*	Mokutachibana	V-VI	t	n	h	w	a	o	57	C12	*Xylocopa*
	Myr4	*Maesa tenera*	Simaizusenryou	III-IV	s	n	h	w	a	o	29	C9	small fly
	Myr5	*Myrsine seguinii*	Taimintachibana	II	t	n	d	g	a	o	1	–	wind
Primulaceae	Pri1	*Lysimachia mauritiana*	Hamabossu	III-VI	p	n	h	w	a	o	10	C12	calyptrate fly
	Pri2	*Lysimachia decurrens*	Shimaginreika	IV	p	n	h	w	a	o	0	–	?
	Pri3	*Lysimachia sikokiana*	Morokoshisou	VII	p	n	h	y	a	o	0	–	?
	Pri4	*Anagallis arvensis*	Rurihakobe	III	a	a	h	b	a	o	0	–	?
Rosidae													
Rosales													
Pittosporaceae	Pit1	*Pittosporum tobira*	Tobera	III-IV	t	n	d	w	a	t	50	C12	*Tetralonia*
Hydrangeaceae	Hyd1	*Deutzia naseana*	Ooshimautsugi	III-IV	s	n	h	w	a	o	43	C3	small bee
Crassulaceae	Cra1	*Sedum formosanum*	Hamamannengusa	VI	p	n	h	y	a	o	3	–	small bee
Rosaceae	Ros1	*Rhaphiolepis indica var. umbellata*	Sharinbai	IV	t	n	h	w	a	o	4	C14	*Tetralonia*
	Ros2	*Rubus sieboldii*	Hourokuichigo	III-IV	s	n	h	w	a	r	3	C14	*Tetralonia*
	Ros3	*Rubus croceacanthus*	Ryuukyuubaraichigo	II	s	n	h	w	a	r	3	C6	*Apis*
	Ros4	*Rubus grayanus*	Ryuukyuuichigo	III	s	n	h	w	a	r	1	–	*Tetralonia*
	Ros5	*Rubus parvifolius*	Nawashiroichigo	III	s	n	h	pk	a	r	0	–	*Tetralonia*
Fabales													
Caesarpiniaceae	Leg1	*Bauhinia japonica*	Hakamakazura	VI	l	n	h	c	a	r	1	C11	butterfly
	Leg2	*Caesarpinia crista*	Nantenkazura	VI	l	n	h	y	z	r	0	–	?
Fabaceae	Leg3	*Canavalia lineata*	Hamanatamame	VI-VII	p	n	h	pl	z	p	3	C13	megachilid
	Leg4	*Melilotus officinalis*	Shinagawahagi	VI	a	a	h	y	z	p	0	–	?
	Leg5	*Vigna marina*	Hamaazuki	VI-VII	p	n	h	y	z	p	6	C3	megachilid

	Leg6	*Lotus australis*	Shirobanamiyakogusa	III	p	n	h	w	z	p	0	–	?
	Leg7	*Maackia tashiroi*	Shimaenju	VII	t	n	h	w	z	p	7	C13	megachilid
	Leg8	*Ormocarpum cochinchinense*	Hamasenna	VII	t	n	h	w/pl	z	p	1	C13	megachilid
Myrtales													
Lythraceae	Lyt1	*Lagerstroemia subcostata*	Shimasarusuberi	VII-VIII	t	n	h	pk	a	r	67	C1	small bee
Myrtaceae	Myt1	*Syzygium buxifolium*	Adeku	VII	t	n	h	w	a	o	0	–	?
Melastomataceae	Mel1	*Blastus cochinchinensis*	Miyamahashikanboku	VIII	s	n	h	w	z	r	1	–	syrphid fly
	Mel2	*Bredia hirsuta*	Hashikanboku	X	s	n	h	pk	a	r	7	C9	small bee
	Mel3	*Melastoma candidum*	Nobotan	V-VII	s	n	h	pk	a	r	12	C10	Amegila
Rhizophorales													
Rhizophoraceae	Rhi1	*Kandelia candel*	Mehirugi	VIII	t	n	h	w	a	r	18	C3	*Xylocopa*
Celastrales													
Aquifoliaceae	Aqu1	*Ilex integra*	Mochinoki	VI	t	n	d	g	a	o	35	C8	calyptrate fly
Euphorbiales													
Euphorbiaceae	Eup1	*Antidesma japonicum*	Yamahihatsu	V-VI	s	n	d	pk	a	a	17	C8	calyptrate fly
	Eup2	*Breynia officinalis*	Ooshimakobannoki	V	t	n	m	g	a	a	0	–	?
	Eup3	*Glochidion acuminatum*	Urajirokannkonoki	V-VI	t	n	m	g	a	a	101	C3	various insects
	Eup4	*Glochidion obovatum*	Kankonoki	V-X	t	n	m	g	a	a	34	C1	various insects
	Eup5	*Glochidion zeylanicum*	Kakibakankonoki	V-VI	t	n	m	g	a	a	34	C1	various insects
	Eup6	*Macaranga tanarius*	Oobagi	VI	t	n	d	g	a	a	0	–	?
	Eup7	*Mallotus japonicus*	Akamegashiwa	V-VI	t	n	m	y	a	a	110	C8	*Xylocopa*
	Eup8	*Securinega suffruticosa var. amamiense*	Amamihitotsubahagi	V	s	n	d	y	a	a	6	–	various insects
Rhamnales													
Rhamnaceae	Rha1	*Rhamnella franguloides var. inaequilatera*	Yaeyamanekonochichi	VI	t	n	h	g	a	o	21	C12	various insects
Vitaceae	Vit1	*Ampelopsis brevipedunculata var.glabrifolia*	Terihanobudou	VI-VIII	l	n	h	g	a	o	45	C3	small bee
Sapindales													
Staphyleaceae	Sta1	*Euscaphis japonica*	Gonzui	IV	t	n	h	g	a	o	18	C12	various insects
	Sta2	*Turpinia ternata*	Shoubennoki	III-IV	t	n	h	w	a	o	0	–	?
Aceraceae	Ace1	*Acer insulae*	Shimaurikaede	III	t	n	d	g	a	o	12	C1	various insects
Rutaceae	Rut1	*Euodia meliifolia*	Hamasendan	X	t	n	d	w	a	o	25	C3	*Xylocopa*
Apiales													
Araliaceae	Arl1	*Dendropanax trifidus*	Kakuremino	VIII	t	n	h	g	a	o	17	C1	*Xylocopa*
	Arl2	*Schefflera octophylla*	Fukanoki	XII	t	n	h	g	a	o	40	C8	calyptrate fly
Apiaceae	Api1	*Peucedanum japonicum*	Botanboufuu	III-V	p	n	h	w	a	o	66	C12	small bee
Asteridae													
Gentianales													
Gentianaceae	Gen1	*Swertia tashiroi*	Hetsukarindou	XII	p	n	h	pl	a	o	0	–	?

Apocynaceae	Apo1	*Cerbera manghas*	Mifukuragi	VI-X	t	n	h	w	a	t	4	C2	hawkmoth
	Apo2	*Trachelospermum gracilipes var. liukiuense*	Okinawateikakazura	V	l	n	h	w	a	t	0	–	?
Asclepidaceae	Asc1	*Tylophora japonica*	Tokiwakamomezuru	V,X	p	n	h	pl	a	o	0	–	?
Solanales													
Convolvulaceae	Con1	*Ipomoea indica*	Noasagao	III-XII	p	n	h	b	a	f	1	–	*Tetralonia*
Lamiales													
Verbenaceae	Ver1	*Callicarpa japonica var. luxurians*	Oomurasakishikibu	VIII	t	n	h	pl	a	o	15	C12	small bee
	Ver2	*Clerodendrum inerme*	Ibotakusagi	VI	s	n	h	w	a	t	0	–	?
	Ver3	*Clerodendrum trichotomum var. yakusimense*	Amakusagi	VIII-X	t	n	h	w	z	t	41	C9	hawkmoth
	Ver4	*Premna corymbosa var. obtusifolia*	Taiwanuokusagi	VI-VIII	s	n	h	c	z	o	8	C3	various insects
	Ver5	*Vitex rotundifolia*	Hamagou	VI-X	s	n	h	pl	z	t	16	C3	*Xylocopa*
	Ver6	*Premna microphylla*	Hamakusagi	V,VIII	t	n	h	c	z	o	10	C3	*Xylocopa*
	Ver7	*Lippia nodiflora*	Iwadaresou	V	p	n	h	pk	z	o	0	–	?
Lamiaceae	Lab1	*Mosla dianthera*	Himejiso	X	p	n	h	w	z	c	12	C9	various insects
	Lab2	*Ajuga dictyocarpa*	Onikiransou	III-IV	p	n	h	pk	z	t	4	C14	*Tetralonia*
	Lab3	*Scutellaria rubropunctata*	Akaboshitatsunamisou	III-IV	p	n	h	pl	z	t	0	–	?
Scrophulariales													
Oleaceae	Ole1	*Ligustrum japonicum*	Nezumimochi	VI	t	n	h	w	a	t	16	C12	small bee
Scrophulariaceae	Scr1	*Lindernia setulosa*	Shisobaurikusa	VII	p	n	h	pk	z	t	0	–	?
Orobanchaceae	Oro1	*Aeginetia indica*	Nanbangiseru	X	p	n	h	pk	a	t	5	–	?
Gesneriaceae	Ges1	*Rhynchotechum discolor*	Yamabiwasou	VIII	p	n	h	w	z	c	2	C7	syrphid fly
Acanthaceae	Aca1	*Codonacanthus pauciflorus*	Arimorisou	X-XII	p	n	h	w	a	c	0	-	?
Campanulales													
Goodeniaceae	Goo1	*Scaevola frutescens*	Kusatobera	VI-VIII	s	n	h	w	z	t	10	C8	Amegilla
Rubiales													
Rubiaceae	Rub1	*Gardenia jasminoides*	Kuchinashi	V	t	n	h	w	a	t	0	–	hawkmoth
	Rub2	*Hedyotis biflora var. parvifolia*	Sonaremugura	VIII	p	n	h	w	a	o	0	–	?
	Rub3	*Lasianthus japonicus*	Ryuukyuuruminoki	XII	s	n	h	w	a	t	2	–	?
	Rub4	*Morinda umbellata*	Hanagasanoki	VI	t	n	h	g	a	o	1	–	?
	Rub5	*Musaenda parviflora*	Konronka	V-VI	t	n	d	o/w	a	t	34	C12	hawkmoth
	Rub6	*Paederia scandens*	Yaitobana	X	p	n	h	w/r	a	t	0	–	?
	Rub7	*Psychotria homalosperma*	Bochouji	VI-VIII	t	n	d	w	a	c	3	C4	vespid wasp
	Rub8	*Psychotria sepens*	Shiratamakazura	V-VII	l	n	d	w	a	c	10	C12	small bee
	Rub9	*Randia canthioides*	Shimamisaonoki	V	t	n	h	c	a	t	0	C8	calyptrate fly
	Rub10	*Tarena gracilipes*	Gyokushinka	V	t	n	h	w	a	t	0	–	?
	Rub11	*Tricalysia dubia*	Shiromimizu	VI	t	n	h	w	a	t	0	–	?
	Rub12	*Wendlandia formosana*	Akamizuki	VI-VII	t	n	h	w	a	o	51	C1	small bee

Dipsacales													
Caprifoliaceae	Cap1	*Viburnum suspensum*	Gomoju	XII	s	n	h	w	a	o	0	–	?
Asterales													
Asteraceae	Ast1	*Blumea lanceolaria*	Ookibanamukashiyomogi	III-IV	p	n	h	y	a	h	0	–	?
	Ast2	*Cirsium brevicaule*	Shimaazami	III-VI	p	n	h	w	a	h	3	–	?
	Ast3	*Conyza japonica*	Izuhahako	V-VI	a	n	h	w	a	h	0	–	?
	Ast4	*Crepidiastrum lanceolatum*	Hosobawadan	XII-III	p	n	h	y	a	h	44	C6	Colletes
	Ast5	*Dendranthema crassum*	Ooshimanojigiku	XII	p	n	h	w	a	h	0	–	?
	Ast6	*Farfugium japonicum*	Tsuwabuki	XII	p	n	h	y	a	h	8	C1	Colletes
	Ast7	*Ageratum houstonianum*	Murasakikakkoazami	X	a	a	h	pl	a	h	3	–	?
	Ast8	*Wedelia biflora*	Kidachihamaguruma	III-XII	p	n	h	y	a	h	2	–	*Tetralonia*
	Ast9	*Youngia japonica*	Onitabirako	III	p	n	h	y	a	h	39	–	small bee
	Ast10	*Bidens pilosa var. radiata*	Shirobanasendangusa	II-III	a	a	h	w	a	h	1	–	?
	Ast11	*Aster asa-grayi*	Isonogiku	III	p	n	h	pl	a	h	5	–	?
Arecidae													
Pandanales													
Pandanaceae	Pan1	*Pandanus odoratissimus*	Adan	VIII	s	n	m	c	a	a	11	C12	beetle
Arales													
Araceae	Ara1	*Alocasia odora*	Kuwazuimo	VI	p	n	m	w	a	a	25	C12	small fly
Commelinidae													
Commelinales													
Commelinaceae	Com1	*Pollia japonica var. minor*	Koyabumyouga	VI	p	n	h	w	a	o	3	–	small bee
Cyperales													
Cyperaceae	Cyp1	*Scleria terrestris*	Ooshinjugaya	III	p	n	m	g	a	a	0	–	wind
Zingiberidae													
Zingiberales													
Musaceae	Mus1	*Musa balbisiana*	Ryuukyuuitobashou	VIII	p	n	m	pl	z	t	1	–	bird?
Zingiberaceae	Zin1	*Alpinia formosana*	Kumatakeran	VI-VII	p	n	h	w/r	z	t	2	C10	Amegila
	Zin2	*Alpinia intermedia*	Aonokumatakeran	VI-VII	p	n	h	w/pk	z	t	3	C10	Amegila
	Zin3	*Alpinia speciosa*	Gettou	V-VII	p	n	h	w/o	z	t	6	C10	Amegila
Liliidae													
Liliales													
Liliaceae	Lil1	*Ophiopogaon jaburan*	Noshiran	VIII	p	n	h	w	a	o	0	–	?
	Lil2	*Dianella ansifolia*	Kikyouran	V	p	n	h	b	a	o	0	–	?
Iridaceae	Iri1	*Belamcanda chinensis*	Hiougi	V	p	n	h	o	a	f	1	C11	butterfly
Stemonaceae	Stm1	*Croomia japonica*	Himenabewari	V-VII	p	n	h	c	a	o	5	–	small fly

Orchidales													
Orchidaceae	Orc1	*Habenaria cirrhifera*	Ryuukyuusagisou	X	p	n	h	w	z	o	0	–	?
	Orc2	*Amitostigma lepidum*	Okinawachidori	III	p	n	h	pl	z	t	0	–	?
	Orc3	*Liparis formosana*	Yuukokuran	V	p	n	h	c	z	o	0	–	?
	Orc4	*Goodyera procera*	Kinginsou	V-VI	p	n	h	c	z	o	0	–	?

MB, months when blooming.
GH, growing habit: a, annual; l, liana; p, perrennial; s, shrub; t, tree.
N, nativity: a, alien; c, cultivated; n, native.
BS, breeding system: d, dioecious; h, hermaphrodite; m, monoecious.
FC, flower color: b, blue; c, cream; g, green; o, orange; pk, pink; pl, purple; r, red; w, white; y, yellow.
FS, flower symmetry: a, actinomorphic; z, sygomorphic.
FM, flower morphology: a, apetalous; b, brush; c, cup/bell-shaped; f, funnelform; h, head; o, open regular; p, papilionaceous; r, rotate; t, tubular.
NV, number of flower visitors observed.
CL, cluster detected by an analysis of flower visitor spectra (see Fig. 12).
PA, Pollination agents.

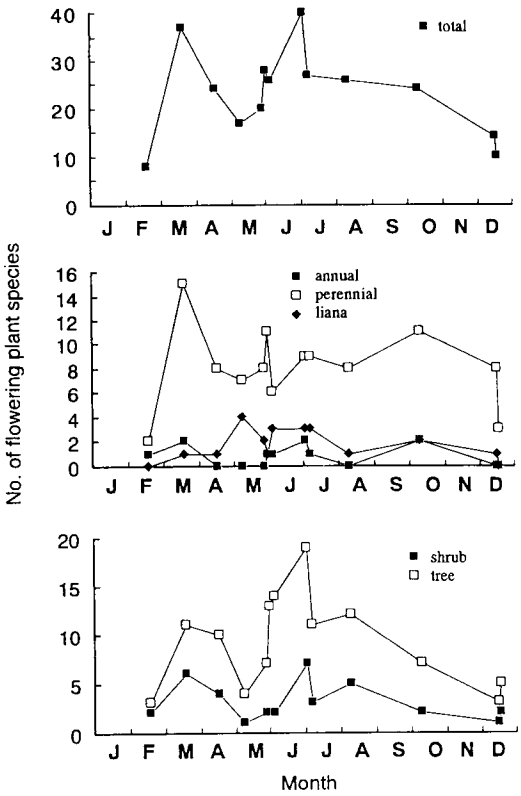

Fig. 3. Seasonal changes in the number of plant species blooming at each sampling date on Amami Islands. Plant species are sorted by their habit; annual, perennial, liana, shrub and tree.

2. *Flowering phenology*

Flowering was observed almost throughout the year from February to December (Fig. 3, 4). During winter from December to February, the most prominent flowers were yellow heads of *Crepidiastrum lanceolatum* in coastal habitats. In *Castanopsis* forests in February, only a few tree species such as *Eurya japonica* and *Myrsine seguinii,* were blooming. In March, 15 perennial and 11 tree and 7 shrub species bloomed, and the number of flowering plant species peaked (Fig. 3). The dominant plant species of the lowland forest, *Castanopsis sieboldii* subsp. *leutchuensis,* flowered altogether during the end of March to the middle of April. During the mass flowering period, the canopy of the forest was colored yellow, and the strong smell of the flower filled the forest.

During the rainy season from May to June, the number of flowering plant species was kept low, while decorative white calyxes of *Mussaenda parviflora* were conspicuous on the edges of lowland forests. From the end of June to July, the number of flowering species peaked again, and this peak was mainly due to flowering of 20 tree and five climber species (Fig. 4). This season was also characterized by flowering of three

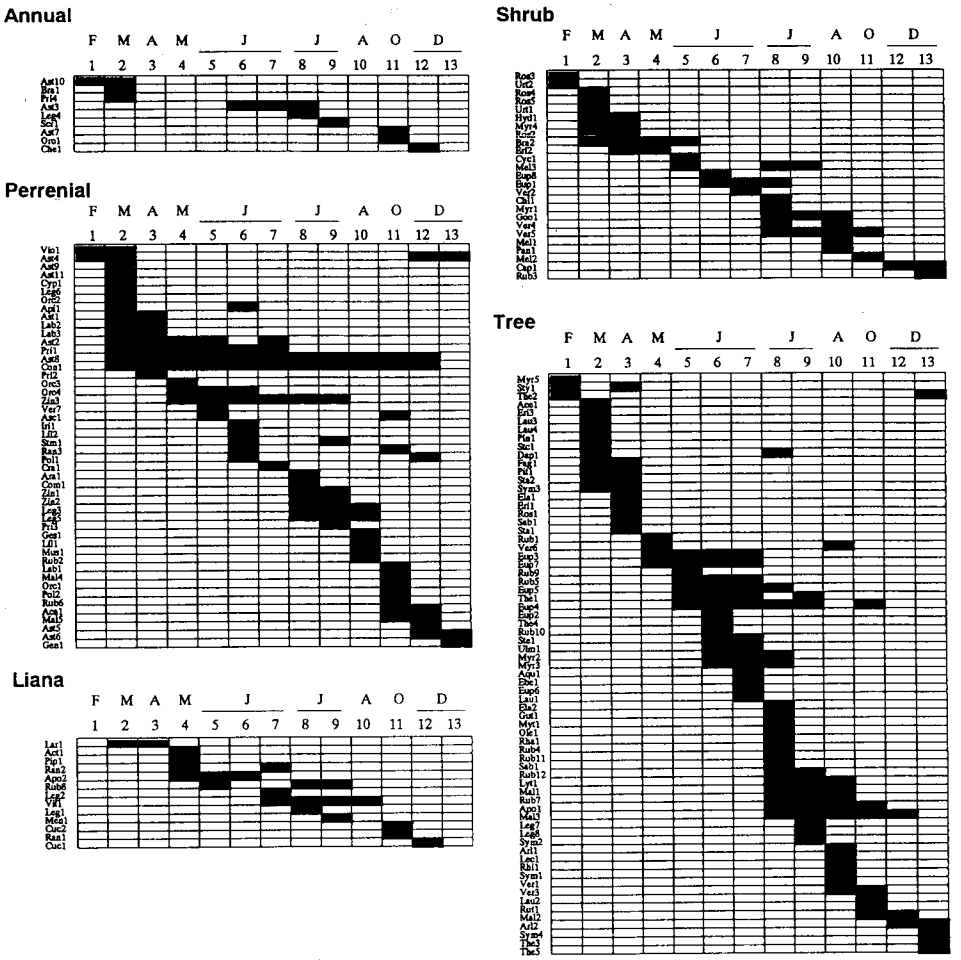

Fig. 4. Flowering records of observed plant species on Amami Islands.

species of gingers, *Alpinia* spp. at the forest floor.

In August, there were few flowering tree species except in a mangrove forest, where the dominant tree species *Kandelia candel* and *Barringtonia racemosa* bloomed during this month. The number of flowering tree species decreased from summer to autumn, while flowering of the perennial species had a peak in October (Fig. 4). The tree species flowering in October were *Litsea japonica, Euodia meliifolia* and *Hibiscus makinoi.* In December, the number of flowering species bottomed, while *Crepidiastrum lanceolatum* and *Farfugium japonicum* started to open yellow flowers.

3. *Flower-visiting insect community*

3.1. *Faunal makeup*

A total of 2210 individuals of 610 species in 12 orders of Insecta were observed on the flowers of 164 plant species (Table 4, Appendix 2). When the relationship between

the number of individuals and number of species was applied to Fisher's logarithmic series (Fisher et al., 1943), the Fisher's index of diversity, α was estimated to be 278.

The most abundant order was Diptera (31.6% of individuals) followed by Coleoptera (28.3%), Hymenoptera (23.3%), Hemiptera (10.6%), Lepidoptera (3.8%), and etc. (Fig. 5). The relative number of species was greatest also in Diptera (35.6%), followed by Coleoptera (23.9%), Hymenoptera (19.9%), Hemiptera (9.9%) and Lepidoptera (6.6%). The mean number of individuals per species was highest in Coleoptera (4.3), followed by Diptera (4.3), Hymenoptera (4.2), Hemiptera (3.9) and Lepidoptera (2.1).

Table 4. A list of insect families collected or observed on flowers on Amami-Oshima Islands, with their larval/adult feding habits, numbers and percentages of species and individuals.

Order	Family	Larval feeding habit	Adult feeding habit	Species		Individual	
				No.	%	No.	%
Blattaria							
	Blattellidae	o	o	2	0.33	6	0.27
Orthoptera							
	Mogoplistidae	o	o	1	0.16	2	0.09
Dermaptera							
	Psalididae	o	o	1	0.16	5	0.23
Psocoptera							
	Caeciliidae	m	m	3	0.49	17	0.77
	Stenopsocidae	m	m	3	0.49	3	0.14
	Lachesillidae	m	m	1	0.16	3	0.14
	Psocidae	m	m	3	0.49	5	0.23
Thysanoptera							
	Phlaeothripidae	ph	ph	2	0.33	2	0.09
	Thripidae	ph	ph	2	0.33	6	0.27
Hemiptera							
	Cixiidae	ph	ph	2	0.33	8	0.36
	Delphacidae	ph	ph	1	0.16	1	0.05
	Derbidae	ph	ph	2	0.33	10	0.45
	Achilidae	ph	ph	2	0.33	14	0.63
	Dictyopharidae	ph	ph	1	0.16	4	0.18
	Tropiduchidae	ph	ph	1	0.16	7	0.32
	Flatidae	ph	ph	1	0.16	3	0.14
	Ricaniidae	ph	ph	2	0.33	8	0.36
	Cercopidae	ph	ph	1	0.16	5	0.23
	Membracidae	ph	ph	1	0.16	4	0.18
	Ledridae	ph	ph	1	0.16	1	0.05
	Idioceridae	ph	ph	1	0.16	2	0.09
	Iassidae	ph	ph	1	0.16	1	0.05
	Penthimiidae	ph	ph	1	0.16	1	0.05
	Xestocephalidae	ph	ph	1	0.16	2	0.09
	Nirvanidae	ph	ph	1	0.16	3	0.14
	Errhomenellidae	ph	ph	2	0.33	1	0.05
	Typhlocybidae	ph	ph	2	0.33	2	0.09
	Deltocephalidae	ph	ph	2	0.33	4	0.18
	Psyllidae	ph	ph	2	0.33	30	1.36

Aphididae	ph	ph	1	0.16	1	0.05
Miridae	ph	ph	18	2.95	97	4.39
Anthocoridae	ph	ph	2	0.33	2	0.09
Lygaeidae	ph	ph	3	0.49	14	0.63
Rhopalidae	ph	ph	1	0.16	2	0.09
Pyrrhocoridae	ph	ph	1	0.16	1	0.05
Pentatomidae	ph	ph	6	0.98	6	0.27
Neuroptera						
Chrysopidae	pr	pr	3	0.49	3	0.14
Hemerobiidae	pr	pr	1	0.16	1	0.05
Sialidae	aq	pr	1	0.16	1	0.05
Coleoptera				0.00		
Carabidae	pr	pr	4	0.66	5	0.23
Staphylinidae	ph, o	ph, o	7	1.15	35	1.58
Scarabaeidae	ph	p, ph	8	1.31	30	1.36
Helodidae	aq	p	4	0.66	4	0.18
Buprestidae	x	p, ph	5	0.82	16	0.72
Elateridae	x, ph	p	12	1.97	37	1.67
Cantharidae	pr	pr	10	1.64	55	2.49
Dermestidae	o	p, o	3	0.49	5	0.23
Cleridae	pr	pr	3	0.49	3	0.14
Melyridae	pr	pr	2	0.33	42	1.90
Nitidulidae	ph	p	7	1.15	20	0.90
Phalacridae	ph	p	1	0.16	3	0.14
Silvaniidae	ph	p	2	0.33	2	0.09
Cryptophagidae	ph	p	2	0.33	2	0.09
Languriidae	ph	p	1	0.16	1	0.05
Coccinellidae	pr	p, pr	9	1.48	26	1.18
Mordellidae	ph	p	7	1.15	84	3.80
Oedemeridae	pr	p, pr	3	0.49	26	1.18
Anthicidae	ph	p	2	0.33	23	1.04
Aderidae	ph	p	1	0.16	1	0.05
Scraptiidae	ph	p	1	0.16	29	1.31
Lagriidae	ph	p	3	0.49	7	0.32
Alleculidae	ph	p	3	0.49	32	1.45
Cerambycidae	x	p	10	1.64	18	0.81
Chrysomelidae	ph	p, ph	24	3.93	95	4.30
Anthribidae	x	ph	1	0.16	1	0.05
Apionidae	ph	ph	1	0.16	3	0.14
Curculionidae	x, ph	p, ph	8	1.31	18	0.81
Scolytidae	x	x	1	0.16	1	0.05
Hymenoptera						
Tenthredinidae	ph	n, pr	1	0.16	2	0.09
Braconidae	ps	n	27	4.43	34	1.54
Ichneumonidae	ps	n	16	2.62	24	1.09
Diapriidae	ps	n	1	0.16	1	0.05
Chalcididae	ps	n	1	0.16	1	0.05
Pteromalidae	ps	n	13	2.13	14	0.63
Encyrtidae	ps	n	2	0.33	14	0.63
Elasmidae	ps	n	1	0.16	1	0.05
Eulophidae	ps	n	9	1.48	11	0.50
Cynipidae	ph	n	2	0.33	2	0.09
Scoliidae	ps	n	3	0.49	9	0.41
Formicidae	pr	n, pr	7	1.15	19	0.86
Eumenidae	pr	n, pr	3	0.49	10	0.45
Vespidae	pr	n, pr	4	0.66	25	1.13

Sphecidae	pr	n, pr	5	0.82	8	0.36
Colletidae	n, p	n, p	2	0.33	86	3.89
Halictidae	n, p	n, p	6	0.98	70	3.17
Andrenidae	n, p	n, p	6	0.98	61	2.76
Megachilidae	n, p	n, p	5	0.82	19	0.86
Anthophoridae	n, p	n, p	5	0.82	93	4.21
Apidae	n, p	n, p	2	0.33	10	0.45
Diptera						
Tipulidae	s, aq	n	4	0.66	4	0.18
Culicidae	aq	n, b	4	0.66	4	0.18
Ceratopogonidae	aq, pr	n	5	0.82	7	0.32
Chironomidae	aq	n	2	0.33	3	0.14
Cecidomyiidae	ph, m	n	2	0.33	2	0.09
Mycetophilidae	m	n	2	0.33	2	0.09
Sciaridae	s, m	n	7	1.15	24	1.09
Psychodidae	s, aq	n	2	0.33	2	0.09
Bibionidae	s	n	1	0.16	1	0.05
Stratiomyidae	s, aq	n	2	0.33	2	0.09
Tabanidae	pr	n, b	1	0.16	1	0.05
Bombyliidae	ps	n	2	0.33	3	0.14
Asilidae	pr	n, pr	2	0.33	2	0.09
Empididae	pr	n, pr	20	3.28	49	2.22
Dolicopodidae	s, pr	n, pr	2	0.33	4	0.18
Phoridae	s, ps	n	4	0.66	5	0.23
Syrphidae	s, pr	n, p	22	3.61	107	4.84
Tephritidae	ph	n	9	1.48	31	1.40
Platystomatidae	s	n	1	0.16	1	0.05
Otitidae	s	n	1	0.16	1	0.05
Lauxaniidae	s	n	24	3.93	46	2.08
Milichiidae	s	n	2	0.33	4	0.18
Chloropidae	ph	n	22	3.61	75	3.39
Ephydridae	s, ph	n	1	0.16	1	0.05
Drosophilidae	ph	n	21	3.44	56	2.53
Sphaeroceridae	s	n	1	0.16	3	0.14
Anthomyiidae	ph	n	1	0.16	1	0.05
Muscidae	s	n	24	3.93	33	1.49
Calliphoridae	s	n	6	0.98	195	8.82
Sarcophagidae	s	n	4	0.66	5	0.23
Tachinidae	ps	n	17	2.79	23	1.04
Trichoptera						
Hydroptilidae	aq	—	1	0.16	1	0.05
Hydropsychidae	aq	—	2	0.33	2	0.09
Lepidoptera						
Incurvariidae	ph	n	2	0.33	3	0.14
Gracillaridae	ph	n	3	0.49	14	0.63
Choreutidae	ph	n	1	0.16	2	0.09
Oecophoridae	ph	n	1	0.16	1	0.05
Pyralidae	ph	n	7	1.15	8	0.36
Hesperiidae	ph	n	3	0.49	4	0.18
Papilionidae	ph	n	6	0.98	18	0.81
Pieridae	ph	n	1	0.16	1	0.05
Lycaenidae	ph	n	2	0.33	6	0.27
Danaidae	ph	n	1	0.16	1	0.05
Nymphalidae	ph	n	1	0.16	2	0.09
Geometridae	ph	n	2	0.33	2	0.09
Sphingidae	ph	n	3	0.49	15	0.68

Arctiidae	ph	n	1	0.16	1	0.05
Noctuidae	ph	n	6	0.98	6	0.27
Total			610	100.00	2210	100.00

1 aq, aquatic scavenger/predator; b, blood-sucker; m, mycophagous; n, nectarivorous; o, omnivorous; p, pollenivorous; ph, phytophagous; pr, predatory; ps, parasitic; s, saprophagous; x, xylophagous

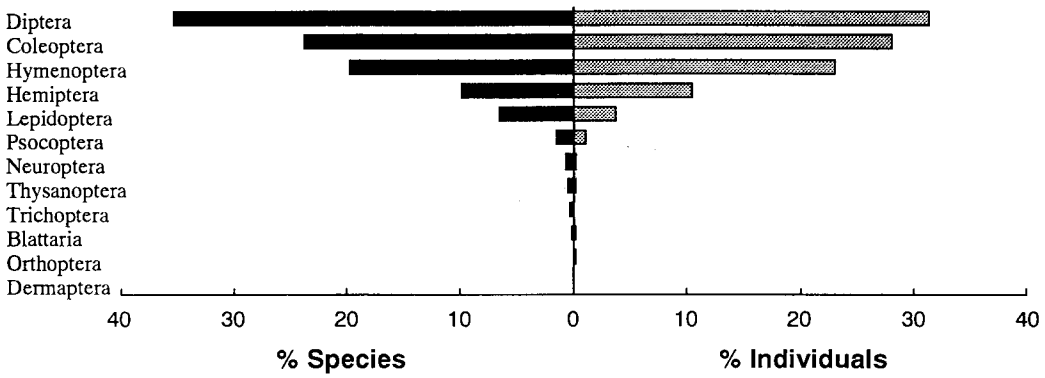

Fig. 5. Flowering records of observed plant species on Amami Islands, where plant species are sorted by their habit; annual, perennial, liana, shrub and tree.

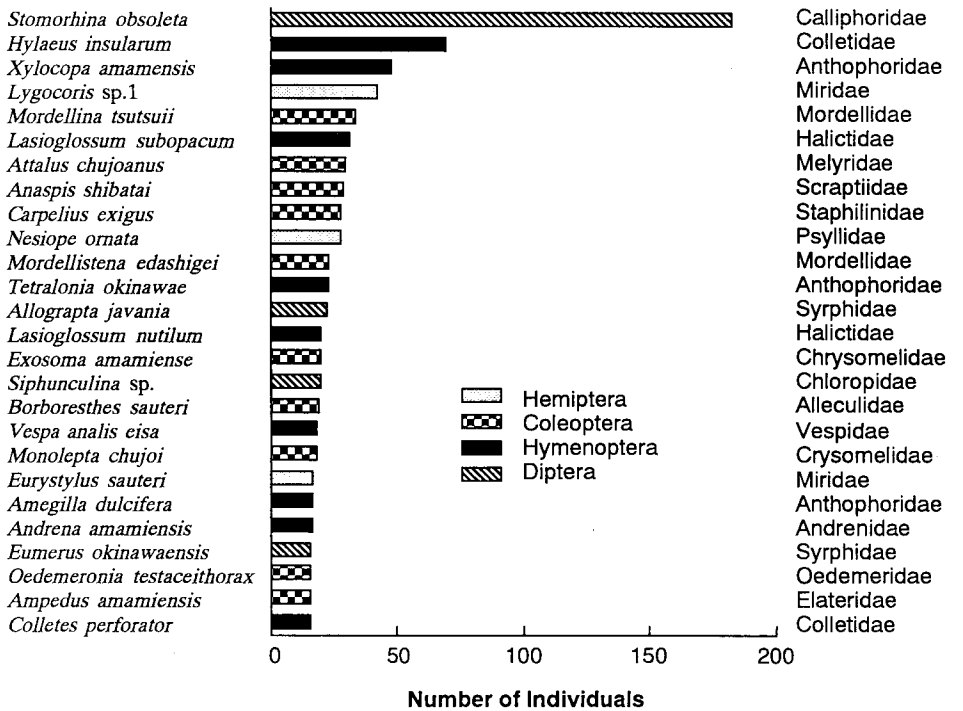

Fig. 6. The percentages of numbers of insect species (left solid bar) and individuals (right open bar) in orders.

The ranking of individual number of each species is shown in Fig. 6. The most abundant species was a calyptrate fly, *Stomorhina obsoleta*. Among the top 26 species, 11 were coleopterans and eight were bees.

3.2. *Hemiptera*

The most abundant family was Miridae (41.5%), followed by Psyllidae (12.8%), Achilidae (6.0%), Lygaeidae (6.0%) and Derbidae (4.3%). Most hemipterans of these anthophilous families were ovule- or phloem-suckers while some were predacious upon other anthophilous insects. Two dominant mirid species were *Eurystylus sauteri* and *Lygocoris* spp. which were found on various species of flowers. The psilid, *Nesiope ornata*, was found only on inflorescence of *Heritiera littoralis*.

3.3. *Coleoptera*

Nine dominant families were Chrysomelidae (15.2%), Mordellidae (13.5%), Cantharidae (8.8%), Melyridae (6.7%), Elateridae (5.9%), Staphylinidae (5.6%), Alleculidae (5.1%), Scarabaeidae (4.8%) and Scraptiidae (4.5%). Most species of these anthophilous beetle families were pollen feeders on various plant species.

The scarabaeid, *Oxycetonia forticula forticula*, was a conspicuous visitor on various flowers probably due to its large size, whereas its recorded number was rather low. While most anthophilous beetle species do not have specificity to floral hosts, the anthicid beetle, *Macratria griseoselata*, was found specifically in flower tubes of *Mussaenda parviflora*.

3.4. *Hymenoptera*

The most abundant superfamily of Hymenoptera was Apoidea (66.0%), followed by Ichneumonoidea (11.3%), Chalcidoidea (8.2%) and Vespoidea (6.8%). In Apoidea, 26 species (six families and 13 genera) and 339 individuals were recorded including 4 new records from Amami Islands (*Colletes perforator, Lasioglossum mutillum, L.* sp., *Andrena kaguya*), and missing nine species which had been recorded by Hirashima (1989). Among these bees, Anthophoridae was the most abundant (27.4%), followed by Colletidae (25.4%), Halictidae (20.6%), Andrenidae (18.0%), Megachilidae (5.6%) and Apidae (2.9%) (Table 5).

The bee fauna was characterized by absence of *Bombus* and by complementary abundance of long-tongued anthophorine bees (*Amegilla and Tetralonia*) and large carpenter bees (*Xylocopa*). The only native eusocial bee was *Apis cerana japonica*, while *A. mellifera* was cultivated locally.

3.5. *Diptera*

The most abundant groups in Diptera were calyptrate flies (36.9%), acalyptrate flies (31.3%) and syrphid flies (15.4%). Ten dominant families were Calliphoridae (28.0%), Syrphidae (15.4%), Chloropidae (10.8%), Drosophilidae (8.0%), Empididae (7.0%), Lauxaniidae (6.6%), Muscidae (4.7%), Tephritidae (4.4%), Sciaridae (3.4%)

Table 5. A list of bee genera in Amami Island, with size class, nest site and relative abundance of them.

Family	Subfamily	Genus	Size class 1	Nest site 2	No. of species	No. of individuals
Colletidae	Hylaeinae	*Hylaeus*	s	s	1	70
	Colletinae	*Colletes*	s	g	1	16
Halictidae	Halictinae	*Lasioglossum*	s	g	5	64
		Nomia	s	g	1	6
Andrenidae	Andreninae	*Andrena*	s	g	6	61
Megachilidae	Megachilinae	*Megachile*	m	s	2	5
		Chalicodoma	m	s	2	7
	Lithurginae	*Lithurgus*	m	s	1	7
Anthophoridae	Anthophorinae	*Amegilla*	m	g	1	17
		Tetralonia	m	g	1	23
	Xylocopinae	*Ceratina*	s	s	2	5
		Xylocopa	l	w	1	48
Apidae	Apinae	*Apis*	m	h	2	10
Total					26	339

1 l, large; m, middle-sized; s, small.
2 g, underground; h, tree hollows; p, cleptoparasitic; s, preexisting cavities such as stem hollows or beetle burrows; w, tree burrows bored by itself.

Table 6. A list of genera, tribes and fubfamilies of anthophilous syrphid flies on Amami Islands, with their feeding habits and numbers of species and individuals.

Subfamily	Tribe	Genus	Feeding habit	No. of species	No. of individuals	% of individuals
Milesiinae	Cheilosini	*Cheilosia*	h	1	3	2.8
	Eristalini	*Eristalinus*	s	3	8	7.5
		Eristalis	s	1	7	6.5
		Phytomia	s	1	12	11.2
	Eumerini	*Eumerus*	h	1	16	15.0
	Milesiini	*Milesia*	w	1	2	1.9
	Xylotini	*Chalcosyrphus*	w	1	1	0.9
		Xylota	w	2	2	1.9
Syrphinae	Bacchini	*Allobaccha*	p	2	8	7.5
	Chrysotoxini	*Chrysotoxum*	p	1	5	4.7
	Syrphini	*Ischirosyrphus*	p	1	1	0.9
		Allograpta	p	1	22	20.6
		Asarkina	p	2	4	3.7
		Didea	p	1	1	0.9
		Episyrphus	p	1	11	10.3
		Eupeodes (Metasyrphus)	p	1	3	2.8
		Parasyrphus	p	1	1	0.9
Total				22	107	100

1 h, herbivorous; p, predacious on aphids; s, saprophagous in aquatic haitat; w, feeding on rotten wood.

and Tachinidae (3.3%). Most species of these anthophilous families were nectar feeders on various species of flowers.

In Syrphidae, 22 species of 17 genera, eight tribes and three subfamilies were recorded (Table 6). Recent work on the biology of syrphid larvae (Ferrar, 1987; Owen and Gilbert, 1989; Rotheray, 1993) enabled us to classify syrphid genera by their larval feeding habits. Among the syrphid individuals observed on flowers, the most abundant was the aphid-predators (9 genera, 11 species, 56 individuals, 52.3% in Syrphidae), followed by aquatic or semi-aquatic saprophages (3 gen., 5 spp., 27 individuals, 25.2%), herbivores (2 gen., 2 spp., 19 individuals, 17.8%) and rotting-wood feeders (3 gen., 3 sp., 5 individuals, 4.7%).

3.6. *Lepidoptera*

The most abundant family was Papilionidae (21.4% in Lepidoptera), followed by Sphingidae (17.9%) and Gracillaridae (16.7%). Three observed genera of Papilionidae were *Papilio, Byasa* and *Graphium*, host food plants of which were Rutaceae (*Euodia*), Aristolochiaceae (*Aristolochia*) and Lauraceae (*Cinnamomum*), respectively. Among three sphingid moth species, *Macroglossum corythus* was the most frequently observed on flowers especially during dawn and dusk. Due to insufficient night observation, visits by nocturnal hawkmoths were underestimated.

4. *Phenology of flower visitors*

The number of collected insects per census had two peaks; one in April and one in June/July (Fig. 7). The bimodal patterns were prevalent among many insect families (Fig. 8), whereas some insect families such as Cantharidae had peaked once in spring, and some families such as Mordellidae, Megachilidae and Vespidae had peaked once in June/July.

Whereas bees were active throughout the year on Amami Island, each species was classified into four groups by their phenological patterns (Fig. 9). The first group is

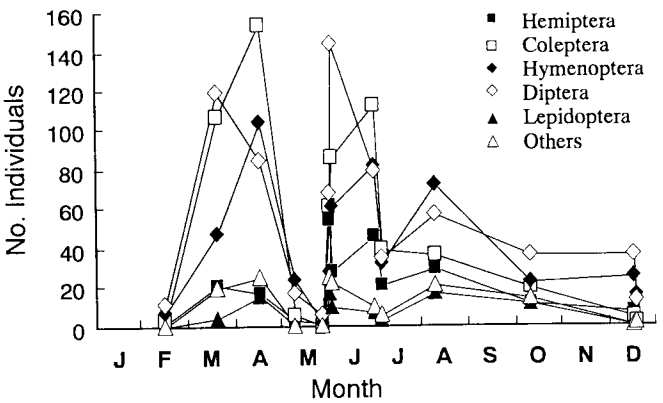

Fig. 7. Abundance ranking of visitor species on Amami Islands.

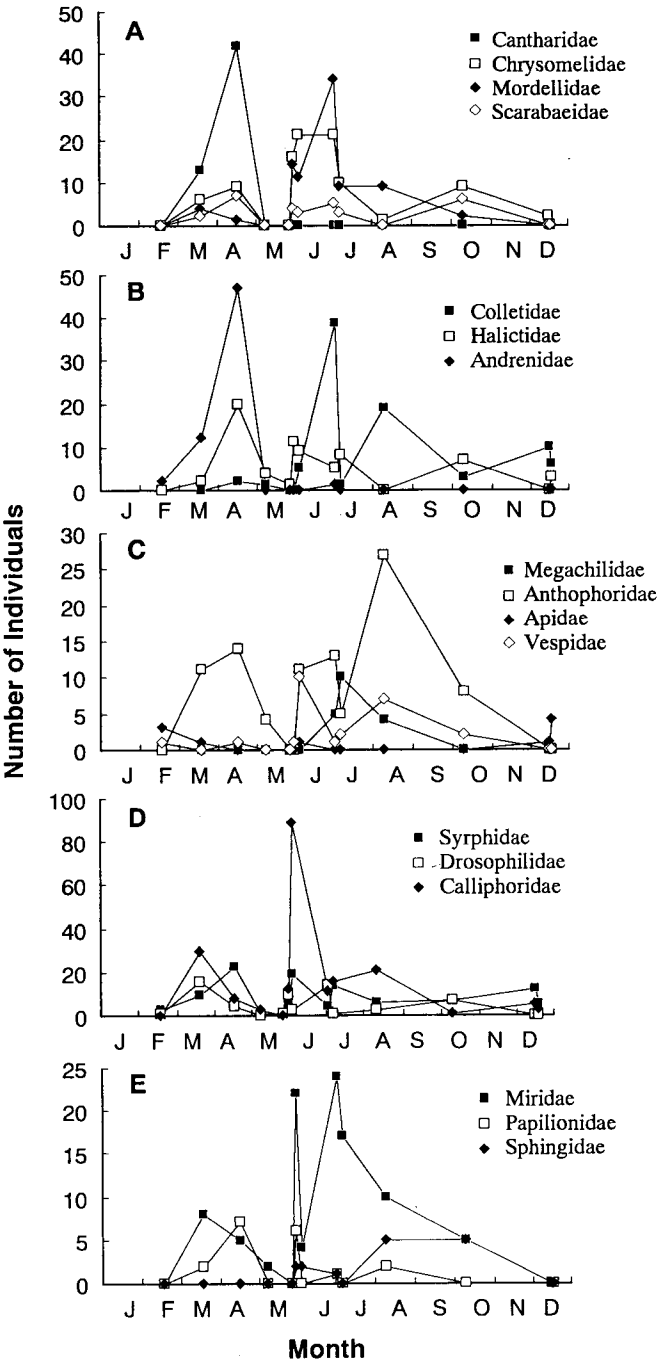

Fig. 8. Seasonal changes in the number of insects observed on flowers at each sampling date. Insects are sorted by order.

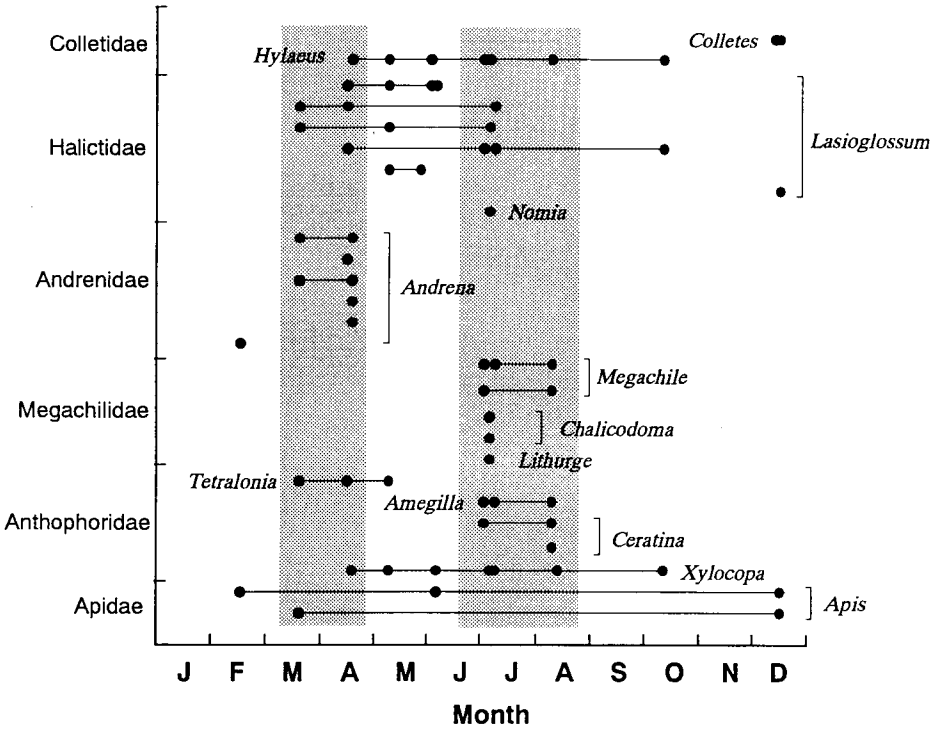

Fig. 9. Seasonal changes in the number of insects of several dominant families observed on flowers at each sampling date. A, Coleoptera; B, C, Hymenoptera; D, Diptera; E, Hemiptera and Lepidoptera.

Andrena and *Tetralonia* which were active only during spring (from February to May). The second group is those active only during summer (from June to August), exemplified by *Nomia, Megachile, Chalicodoma, Lithurge, Amegilla* and *Ceratina.* The third group is those active from spring to autumn, represented by *Hylaeus, Lasioglossum, Xylocopa* and *Apis.* The only native, highly eusocial bee, *Apis cerana,* was active throughout the year, while this species was rather rare except during winter. The last group is *Colletes* which was active only during winter.

5. *Anthophilous insect communities on individual plant species*

5.1. *Principal component analysis*

The anthophilous insect community on each plant species varied greatly among plant species (Appendix 1). In order to search for trends explaining the variance in flower-visiting insect communities, a principal component analysis was made. In this analysis, insects were classified into 16 taxonomic groups; hemipteran, beetle, wasp, small bee, megachilid, *Tetralonia, Amegilla, Colletes/Apis,* syrphid, calyptrate fly, small fly, butterfly, hawkmoth, moth and others. The percentages of these 16 groups in individual number were defined as the flower-visitor spectrum of each plant species.

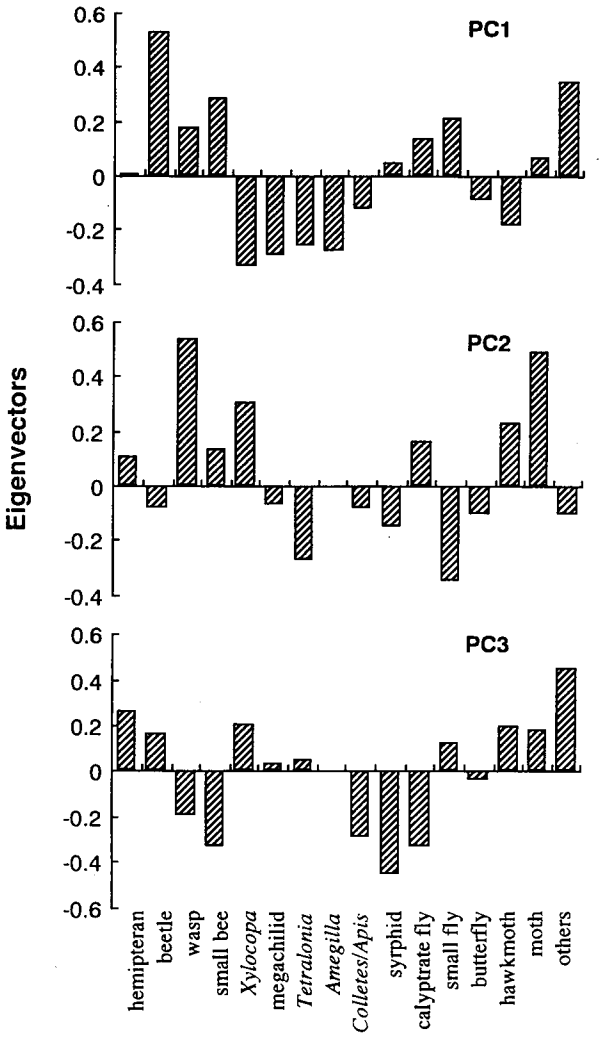

Fig. 10. Phenology of each bee species on Amami Islands. Solid circles denote records of bee's visiting flowers. Shaded areas show the seasons when long-tongued bees were active.

The flower visitor spectra of 81 plant species were used as statistics of the principal component analysis. Eigenvectors of 1st, 2nd and 3rd principal components for each insect group are shown in Fig. 10. The major trend involved alternation of dominant insect groups between beetles/small bees and long-tongued bees (*Xylocopa*, megachilid, *Tetralonia* and *Amegilla*), and the first principal component, PC1, was 11.7% of the total variance. The second factor corresponded to dominance of wasp and moth over small fly and *Tetralonia* (PC2, 9.9%). The third factor was mainly related to alternation of dominant insect groups between syrphid/calyptrate flies and others (PC3, 9.4%). The cumulative percentages of eigenvalues of the first three principal components were 31.0%, suggesting that there are additional factors contributing to the total

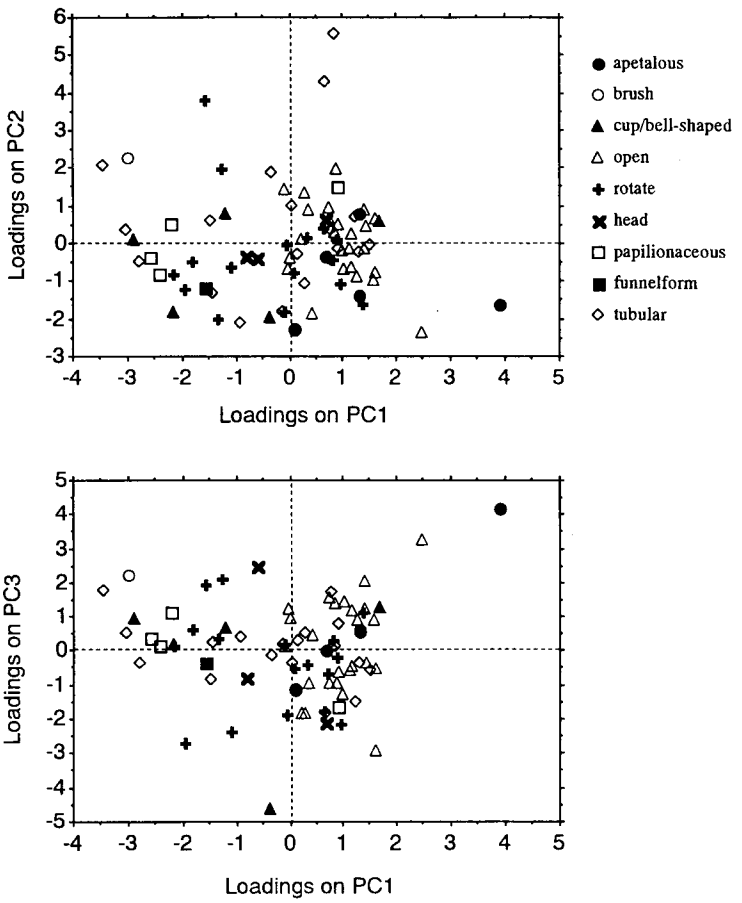

Fig. 11. A result of principal component analysis of flower-visitor spectra of 81 plant species. Eigenvectors of the first three principal components calculated are shown against visitor groups.

variance.

Scattering plots between loadings on PC1 and PC2 in Fig. 11 show that there is a trend that flowers with deep nectaries (e.g., papilionaceous, funnelform, rotate, brush and tubular flowers) have smaller loadings on PC1.

5.2. *Cluster analysis*

The flower-visitor spectra were also subjected to cluster analysis, in which statistics were the percentages of individuals in respective insect groups. A dendrogram derived from the cluster analysis using Ward's minimum variance method is shown in Fig. 12. At semi-partial $r^2 = 0.02$, 81 plant species were divided into 14 clusters.

Cluster 1 (C1) was separated from others by predominance of hemipterans, and was composed of 11 species. All the plants in C1 were visited by not only hemipterans but also various insect groups.

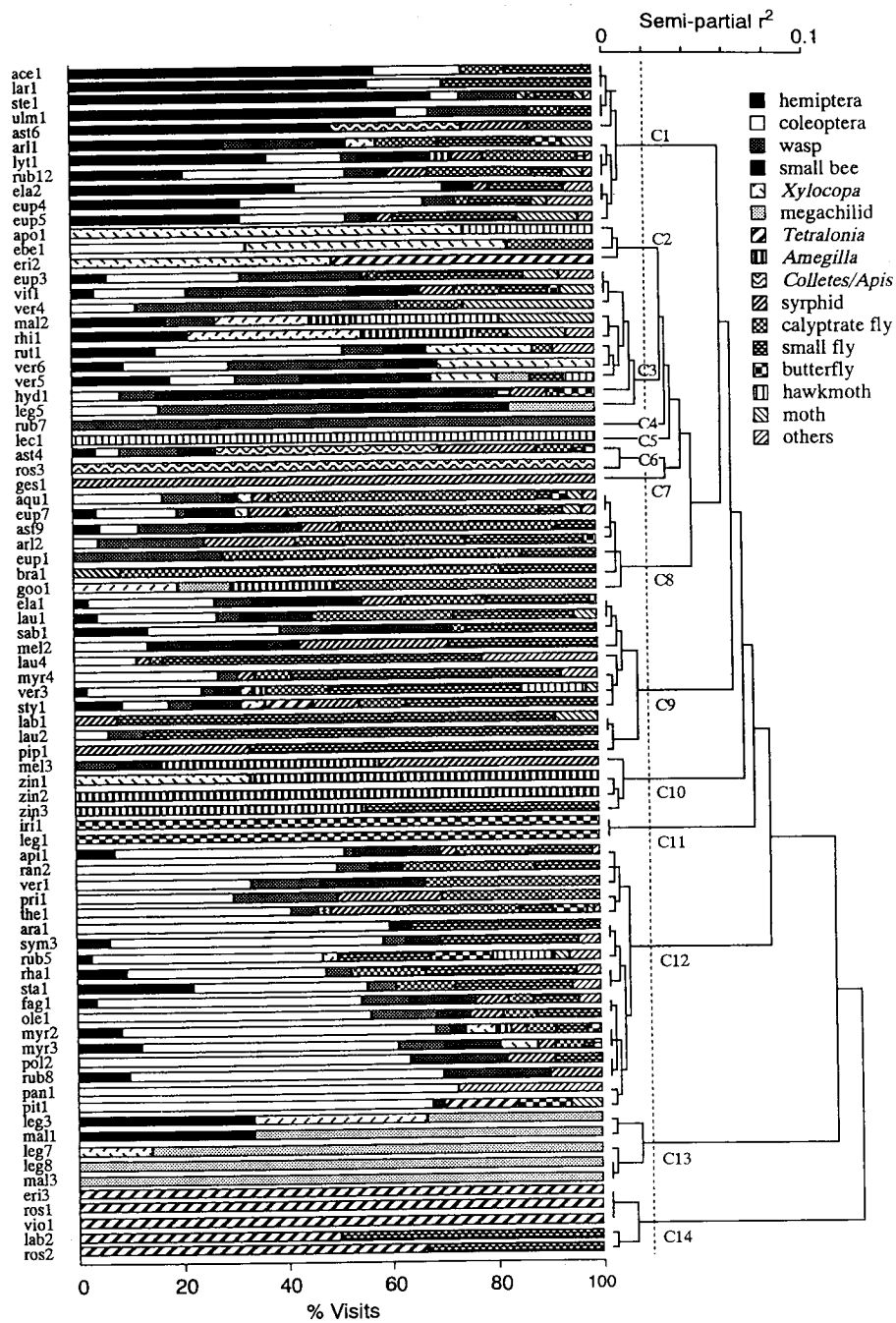

Fig. 12. Scattering graphs obtained by a principal component analysis of flower-visitor spectra of 81 plant species. The loadings of the second and the third principal components (PC2 and PC3) are plotted against the those of the first principal components (PC1). Plots refer to plant species discriminated by flower shape. Eigenvectors of the axes are shown in Fig. 11.

C2 was separated from others by predominance of *Xylocopa*, and was composed of three plant species of *Cerbera manghas* (Apocynaceae), *Diospyros japonica* (Ebenaceae) and *Vaccinium wrightii* (Ericaceae). *Xylocopa* bees robbed nectar of *Cerbera* flowers, collected pollen from *Diospyros* flowers by buzzing, and harvested nectar of *Vaccinium* legally.

C3 was composed of 10 species, and characterized by a mixture of various insect groups, in which bees or wasps constituted large proportions. In C3, *Deutzia naseana* (Hydrangeaceae) and *Vigna marina* (Fabaceae) were visited predominantly by small bees.

C4 and C5 were respectively composed of *Psychotria homalosperma* (Rubiaceae) and *Barringtonia racemosa* (Lecythidaceae), and characterized by dominance of wasps (especially *Vespa* and *Vespula*) and hawkmoths.

C6 was characterized by dominance of *Colletes*/*Apis*, and composed of two winter-blooming plants, *Rubus croceacanthus* (Rosaceae) and *Crepidiastrum lanceolatum* (Asteraceae). *Colletes perforator* and *Apis cerana* were the only bees that were active in winter, and were important pollinators of these winter-blooming plant species.

C7 was composed of *Rhynchotechum discolor* (Gesneriaceae) and characterized by dominance of syrphid flies.

C8 was characterized by dominance of calyptrate flies and composed of seven plant species. Most of these plant species (except *Scaevola frutescens*) had small but nectar-rich flowers and were visited predominantly by a calliphorid fly species, *Stomorhina obsoleta*.

C9 was characterized by dominance of small flies, e.g., Drosophilidae, Chloropidae and Lauxaniidae, and composed of 11 plant species. Most of these had small flowers but a few species, *Elaeocarpus japonicus* (Elaeocarpaceae), *Styrax japonica* (Styracaceae) and *Clerodendrum trichotomum* (Verbenaceae), had more conspicuous flowers and were visited by various bee species.

C10 was characterized by dominance of the long-tongued bee, *Amegilla dulcifera*, and composed of four plant species, i.e., three *Alpinia* spp. (Zingiberaceae) and *Melastoma candidum* (Melastomataceae). The former had tubular corolla with deep nectary, and were frequently visited by traplining *Amegilla* bees and occasionally by *Xylocopa* bees.

C11 was composed of 18 plant species, and characterized by dominance of beetles. The beetle families contributing the dominance on these flowers were Mordellidae, Staphylinidae, Scraptiidae, Nitidulidae and Melyridae, most of which were small-sized and appeared to have less contribution to pollination than bees and larger flies. For example, *Schima wallichii*, *Pittosporum tobira* and *Mussaenda parviflora* in C11 were probably pollinated by less dominant *Xylocopa*, *Tetralonia* and hawkmoths, respectively, while flowers of *Alocasia odora* (Araceae) were dominated by staphilinid beetles, drosophilids (*Colocasiomyia*) were subdominant.

C13 was characterized by dominance of megachilid bees, and composed of three legume species, *Canavalia lineata*, *Maackia tashiroi* and *Ormocarpum cochinchinense*, and

two *Hibiscus* species (Malvaceae). The former three species were visited by *Megachile* and *Chalicodoma*, while the *Hibiscus* species were visited specifically by *Lithurge*.

C14 was characterized by dominance of the long-tongued bee, *Tetralonia okinawae*, and composed of five plant species, two *Rubus* species (Rosaceae), *Rhododendron tashiroi* (Ericaceae), *Viola pseudo-japonica* (Violaceae) and *Ajuga dictyocarpa* (Lamiaceae). All these plant species had tubular or rotate flowers with deep nectaries, and bloomed only during spring.

5.3. *Pollination guilds*

The dominant flower-visitor on each plant species was not always its pollinator. I inferred the actual pollinators by examining the flower-visitor communities, behavior of the flower visitors, pollen attachment on the visitor's body and floral morphology. Among the flower-visitors, the following priority series in the contribution to pollination were hypothesized:

> (*Amegilla, Tetralonia,* megachilids) > *Xylocopa* > *Colletes / Apis* > hawkmoth > small bee > butterfly > (calyptrate fly, syrphid fly) > (beetle, small fly) > hymenopterans other than bees > (hemipterans, others).

Thus, the insects of higher pollination status can be regarded as effective pollinators than those at a lower status, as long as visit frequency of the pollination candidate is not too low. For several clusters in the above analysis (i.e., C2, C4, C5, C6, C10, C11, C13 and C14), the dominant visitors were regarded as pollinators by themselves. For each plant species in other clusters, an effective pollinator group was determined from each visitor assemblage following the above priority series. After these procedures, 104 plant species were classified into the following 13 pollination guilds: *Amegilla-*, *Tetralonia-*, megachilid-, *Xylocopa-*, *Colletes / Apis-*, hawkmoth-, butterfly-, small bee-, calyptrate fly-, syrphid fly-, beetle-, small fly-, wasp- and various insect-, and wind-pollinated guilds (Table 3 and Table 7).

Among these 104 observed plant species, the most dominant pollination type was melittophily (i.e., bee-pollination, 63 species, 61%; including one wasp-pollinated flower species), followed by myophily (i.e., fly-pollination, 14 species, 13%), unspecialized entomophily (10 species, 9.6%), anemophily (7 species, 6.7%), butterfly / hawkmoth-pollination (7 species, 6.7%) and cantharophily (3 species, 2.9%) (Fig. 13A). Among the melittophilous species, small-bee-pollinated species (37%) were the most dominant, followed by *Xylocopa*-(21%), *Tetralonia*-(17%), megachilid-(9.5%), *Amegilla*-(7.9%) and *Colletes/Apis*-(6.3%) and wasp-pollinated (1.6%) species (Fig. 13B).

The pollination syndrome varied with the plant's habits (Fig. 14). *Xylocopa*-pollinated plant species were found in tree or liana, and rarely shrub species, but never in herb species. In turn, *Amegilla*-pollinated species were found only in herb and shrub species, and *Tetralonia*-pollinated species were found except in tree species. Hawkmoth-pollination was observed only in tree species, while butterfly pollination was only

Table 7. A list of plant species constituting 15 pollination guilds. See Table 3 for plant species codes.

Pollination agent	No. of species	%. of species	Plant species codes
wind	7	6.7	Cyc1, Pin1, Dap1, Urt1, Urt2, Myr5, Cyp1
beetle	3	2.9	Lar1, The2, Pan1
wasp	1	1.0	Rub7
small bee	23	22.1	Lau1, Ran1, Ran2, Ran3, Sab2, Fag1, Pol2, Ela1, Ela2, Sym3, Myr1, Hyd1, Cra1, Lyt1, Mel2, Vit1, Api1, Ver1, Ole1, Rub8, Rub12, Ast9, Com1
Colletes/Apis	4	3.8	Bra1, Ros3, Ast4, Ast6
megachilid	6	5.8	Mal1, Mal3, Leg3, Leg5, Leg7, Leg8
Amegilla	5	4.8	Mel3, Goo1, Zin1, Zin2, Zin3
Tetralonia	11	10.6	Vio1, Eri3, Sty1, Pit1, Ros1, Ros2, Ros4, Ros5, Con1, Lab2, Ast8
Xylocopa	13	12.5	The1, Act1, Mal2, Eri2, Ebe1, Myr2, Myr3, Rhi1, Eup7, Rut1, Arl1, Ver5, Ver6
syrphid fly	2	1.9	Mel1, Ges1
calyptrate fly	5	4.8	Pri1, Aqu1, Eup1, Arl2, Rub9
small fly	7	6.7	Lau2, Lau4, Pip1, Pol1, Myr4, Ar1, Stm1
butterfly	2	1.9	Leg1, Iri1
hawkmoth	5	4.8	Lec1, Apo1, Ver3, Rub1, Rub5
various insects	10	9.6	Ulm1, Eup2, Eup4, Eup5, Eup8, Rha1, Sta1, Ace1, Ver4, Lab1
Total	104	100.0	

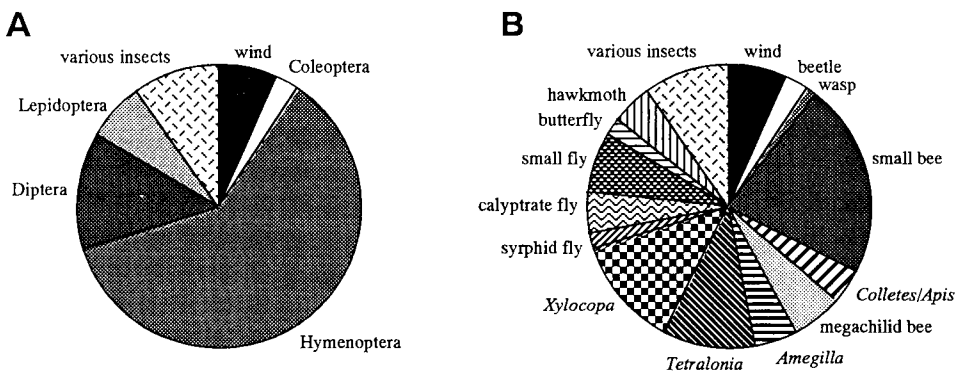

Fig. 13. Flower-visitor spectra (sorted by visitor group) of 81 plant species and dendrogram (right) derived from cluster analysis on the flower spectra. Plant species codes are shown in Table 3.

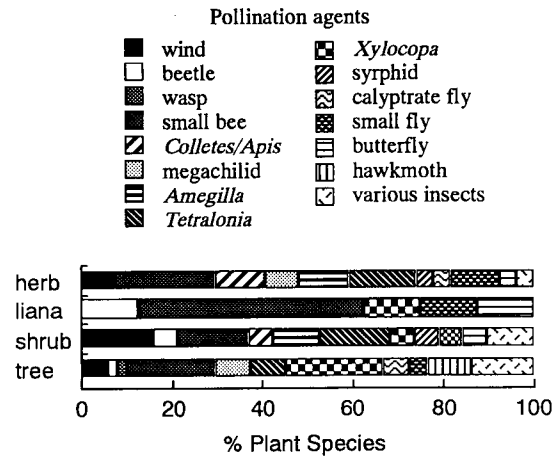

Fig. 14. The frequency distribution of pollination system on Amami Islands.

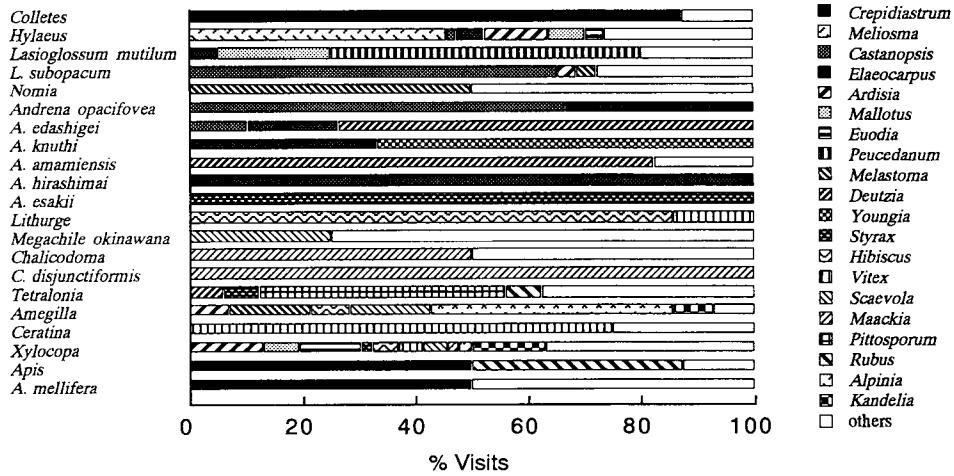

Fig. 15. Flower spectra of 21 bee species.

found in shrub, liana and herb species.

6. *Floral hosts of anthophilous insects*

The plant species which were most frequently utilized by insects was *Castanopsis sieboldii* subsp. leutchuensis (10.8% of total visits), followed by *Meliosma oldhamii* (5.1%), *Mallotus japonicus* (5.0%), *Glochidion acuminatum* (4.5%), *Schima wallichii* (3.4%), *Elaeocarpus japonicus* (3.0%), *Lagerstroemia subcostata* (3.0%) and *Peucedanum japonicum* (3.0%) (Table 3).

The spectra of floral host plant species varied greatly among insect families and species (Appendix 2). For example, floral host spectra of 21 observed bee species ($\geq$ 2

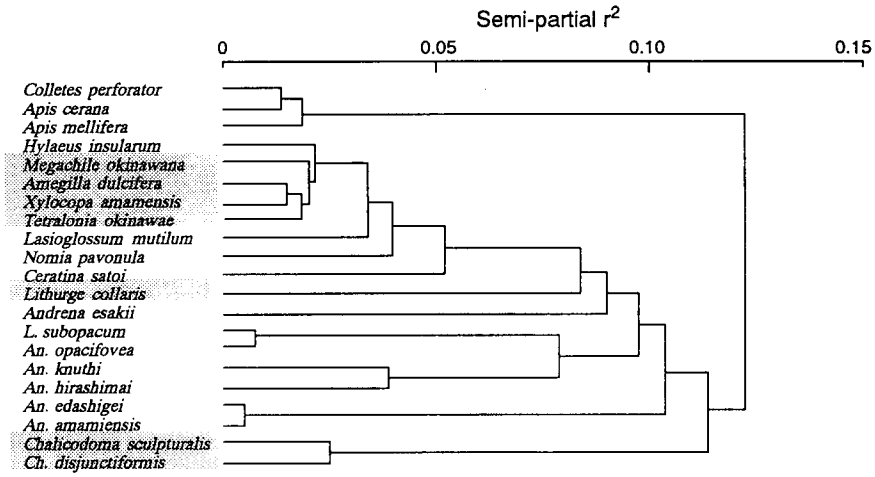

Fig. 16. A dendrogram derived from a cluster analysis on the flower spectra of 21 bee species (Fig. 15). Shaded species are long-tongued bees.

individuals collected) varied greatly among bee species (Fig. 15). Most andrenid and megachilid bees which were active only during a short period were oligolectic. A discrepancy of floral host spectra was observed between large/middle-sized bees and small bees. Floral host species of two dominant long-tongued bee species, *Tetralonia* and *Amegilla*, were completely different because their active periods did not overlap.

Discussion

This is the first report on community-level plant-pollinator interactions in the Ryukyu Archipelago, while several studies on anthophilous insect communities have been conducted at various vegetation types in Japan (Yumoto, 1986; Yumoto, 1987; Yumoto, 1988; Inoue et al., 1990; Kakutani et al., 1990; Kato et al., 1990; Kato et al., 1993; Kato and Miura, 1996). The vegetation and the flora on Amami Islands are somewhat similar to those of the lowland forests of Yaku Island (Yumoto, 1987), 250 km north of Amami Islands, while coral reefs and mangrove forests are prominent only on Amami Islands. I discuss the floral phenology, anthophilous insect community and plant-pollinator interactions on Amami Islands by comparing them with those at various climatic regions with different vegetation types.

Floral phenology

The phenology on Amami island was characterized by (1) two flowering peaks in March to April and June to July, which were interrupted by the monsoon rainy season in May, (2) annual mass-flowering of the dominant canopy tree, *Castanopsis sieboldii* in April, and (3) warm winter during which some plant species bloomed. The mass-flowering of entomophilous *Castanopsis* contrasts well with cool temperate forests where most canopy trees are anemophilous blooming in the early spring (Procter et al.,

1996), and with Southeast Asian tropical rain forests where diverse canopy tree species mass-flower during about three months with an interval of 2-5 years (Ashton, 1988; Sakai et al., 1999b). The phenological pattern on Amami Islands was largely similar to that of lowland forests of Yaku Island (Yumoto, 1987), and tree and shrub species bloomed sequentially almost throughout the year (Fig. 4) whereas abundance of flowers was kept low except in spring and early summer. The number of flower-visiting insects fluctuated largely corresponding to the phenological pattern peaking twice (Figs. 8, 9).

At coastal habitats in the mainland of Japan, there are some winter-blooming plants such as Aster and *Crepidiastrum*, most of which are pollinated by syrphid or calyptrate flies because no bees are active during winter. On Amami Islands, these are several species of winter flowers, which were visited by bees of the genera, *Colletes* and *Apis*. These winter-blooming plants are important for these bees because *Colletes* appears only during winter, and because *Apis* depends on these flowers to sustain their colonies during the severe season. It is noteworthy that these bees are active throughout the year on Amami Islands.

Anthophilous insect community

The community structure of anthophilous insects on Amami Islands was characterized by abundance of dipterans and coleopterans outnumbering hymenopterans, and contrasted with the predominance of bees in temperate forests (Inoue et al., 1990; Kato et al., 1990; Kakutani et al., 1990). The dominance of dipterans was mainly due to the abundance of a calliphorid fly, *Stomorhina*, but not of syrphid flies which are abundant in cool temperate habitats.

The bee fauna of Amami Islands was characterized by (1) absence of bumblebees (which are present in Yaku Is.), (2) absence of stingless bees (which are present in Taiwan and predominant in the tropics; Roubik, 1989), (3) presence of native honeybees (which are present on Yaku Island, and the mainland of Japan and Taiwan, but absent in Okinawa and Sakishima Islands) (Sakagami, 1971), (4) dominance of ground-nesting bees (which are absent in Ogasawara Islands; Kato, 1992), and (5) presence of diverse andrenid bee species (which are rare in Okinawa Islands and absent in Sakishima Islands), and (6) presence of endemic bee species, e.g., *Andrena ishikawai, A. taniguchiae, A. amamensis* and *Xylocopa amamensis* (Hirashima, 1958; 1989).

The subtropical climate is too warm for bumblebees (and to a less extent for andrenids) and too cool for stingless bees. On Amami Islands, Asian honeybees (*Apis cerana*) are the only eusocial bees, while they are not abundant. The rarity of the honeybees may result from difficulty for them to sustain the colonies on the islands where floral resources are apt to fluctuate seasonally and annually. While Asian honeybees cease foraging during winter in temperate habitats, their foraging activity was conspicuous even in winter on Amami Islands. The vulnerable season for them may be autumn when the islands are frequently struck by typhoons. Frequent arrivals of typhoons and limitation of their nest sites, i.e., hollow of large tree trunks on these islands, may affect

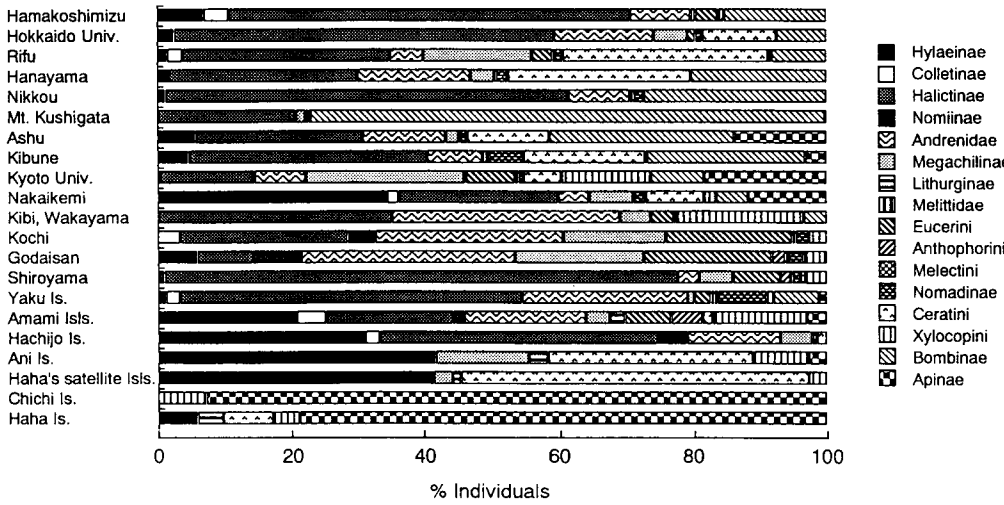

Fig. 17. A comparison of relative abundance of bee tribes among 21 localities in Japan. Data sources are as follows: Hama-Koshimizu (Fukuda et al., 1973), Botanical garden of Hokkaido University in Sapporo (Sakagami and Fukuda, 1973), Rifu and Hanayama in Miyagi Pref. (Go'ukon, 1992), Nikko in Gunma Pref. (Nakamura and Matsumura, 1985), Mt. Kushigata in Yamanashi Pref. (Kato et al., 1993), Ashu (Kato et al., 1990), Kibune (Inoue et al., 1990), Botanical garden of Kyoto University (Kakutani et al., 1990) in Kyoto Pref., Nakaikemi in Fukui Pref. (Kato and Miura, 1996), Kibi in Wakayama Pref. (Matsuura et al., 1972), Kochi (Ikudome, 1978), Godaisan and Shiroyama in Kagoshima Pref. (Ikudome, 1992), Yaku Is. (Yumoto 1994), Amami Islands. (this study), Hachijo Is. (Takahashi, 1990), Ani Is., Haha's satellite islands, Chichi Is. and Haha Is. (Kato, 1999).

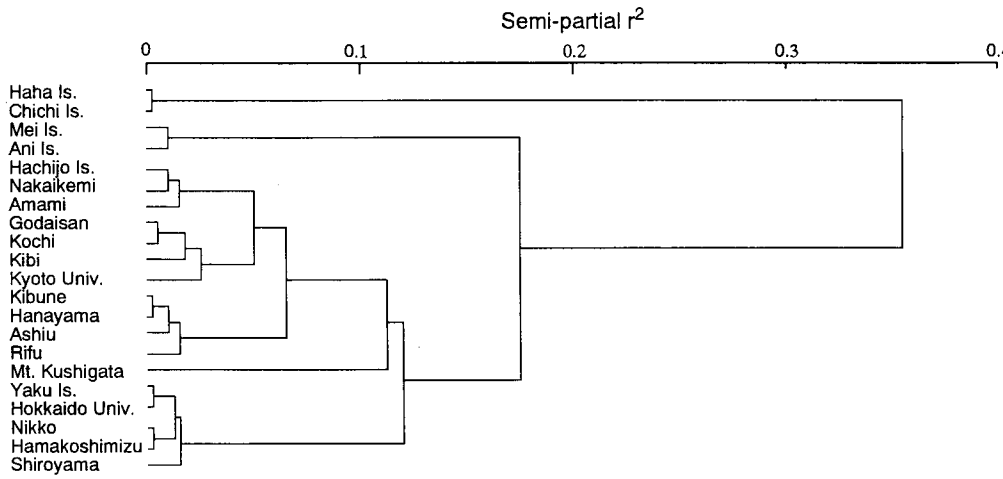

Fig. 18. A dendrogram derived from a cluster analysis on the relative abundance of bee tribes among 21 localities in Japan (Fig. 17).

the sustainability of honeybee colonies.

Next, I compared the bee community on Amami Islands with those at various sites in Japan. There are 21 available data sets of wild bee surveys conducted in various habitats: a cool temperate coastal meadow at Hama-Koshimizu in east Hokkaido (Fukuda et al., 1973), subalpine coniferous forests and meadows at Mt. Kushigata in Yamanashi Pref. (Kato et al., 1993), temperate deciduous forests at Hokkaido University in Sapporo (Sakagami and Fukuda, 1973), Rifu and Hanayama in Miyagi Pref. (Go'ukon, 1992), Nikko in Tochigi Pref. (Nakamura and Matsuura, 1985), Ashu (Kato et al., 1990), Kibune (Inoue et al., 1990) in Kyoto Pref., lowland marsh at Nakaikemi in Fukui Pref. (Kato and Miura, 1996), warm temperate forests in a botanical garden of Kyoto University in Kyoto Univ. (Kakutani et al., 1990), Kibi in Wakayama Pref. (Matsuura et al., 1972), Kochi (Ikudome, 1978), Godaisan and Shiroyama in Kagoshima (Ikudome, 1992), and warm temperate/subtropical forests on Yaku Island (Yumoto, 1994), Amami Islands (this study), Hachijo Island (Takahashi, 1990), Ani, Chichi, Haha and Haha's satellite islands in Bonin Islands (Kato et al., 1999). The compositions of collected bee individuals sorted by tribe at 21 sites are shown in Fig. 17.

The bee community on Amami Islands was characterized by high proportions of Hylaeinae, Halictinae, Andrenidae and Xylocopinae and minor proportion of Apinae. A cluster analysis of the data set showed that the bee community on Amami Island is most closely related to those of Hachijo Island and Nakaikemi marsh (Fig. 18), but differed from both by relative proportions of long-tongued bee tribes, i.e., Eucerini and Anthophorini. Ogasawara Islands and Amami Islands, while sharing similar latitudes and similar climates, had distinctly different bee communities. The native bee communities on Ani and Haha's satellite Islands are composed of solitary bees nesting on only wood/stem cavities but not under ground (Kato, 1992), and lacked andrenid, halictid and anthophorine bees which are dominant on Amami Islands. The bee communities on Chichi and Haha Islands are now dominated by introduced European honeybees (Kato et al., 1999). Introduced European honeybees are now thriving even on Okinawa and Sakishima Islands in the Ryukyu Archipelago, where apiculture is popular and nectariferous weedy plants such as *Bidens pilosa* are thriving especially in disturbed habitats. However, European honeybees are still not common on Amami Islands, probably because vespid wasps attacking honeybees are abundant there, partly because the nectariferous weedy plants are still uncommon in natural vegetation on Amami Islands, and because the native Asian honeybee, *Apis cerana,* is potentially competitor of *A. mellifera.*

The hoverfly community on Amami Islands was next compared with those at a lowland marsh at Nakaikemi, temperate forests at Ashu and Kibune, a botanical garden of Kyoto University, and subalpine coniferous forests and meadows at Mt. Kushigata (Fig. 19), and characterized by relative abundance of aphidophagous tribes, Syrphini, Bacchini and Chrysotoxini, and by minor proportions of phytophagous tribe Cheilosini.

Plant-pollinator interaction

A multi-variable analysis on compositions of insect species observed on 81 species of flowers detected 14 clusters (Fig. 12). Among various observed plant species, the pollination system of *Psychotria homalosperma* was unique because it was visited only by vespid wasps. Chemical analyses of floral fragrance and nectar may answer how this unique pollination system is maintained.

The dominant flower-visitor on each plant species was not always its pollinator, and the most dominant pollination system among 104 plant species was melittophily (61%), followed by myiophily, unspecialized entomophily, anemophily, butterfly /hawkmoth-pollination and cantharophily. Among melittophilous species, small-bee-pollinated species (37%) were most dominant, followed by *Xylocopa-*, *Tetralonia-*, megachilid-, *Amegilla-* and *Colletes/Apis-* and wasp-pollinated species. While birds and mammals are important pollinators both in tropical forests in Costa Rica (Kress and Beach, 1994) and in Sarawak (Momose et al., 1998), bird- and mammal-pollination systems were not observed on Amami Islands.

The proportion of those plants pollinated by long-tongued solitary bees (*Xylocopa, Tetralonia,* megachilids, *Amegilla*) was 55.4%, which is higher than that of the tropical rain forest in Sarawak (18.5%; Momose et al., 1998). The high proportions of these plants pollinated by long-tongued solitary bees contrasted with the high proportions of bumblebee-pollinated flowers at lowland (52.7%) and highland (52.5%) forests on Yaku Island (Yumoto, 1987; 1988, respectively), at alpine zone at Kiso-Komagatake (47.8%, Yumoto, 1986), at subalpine zone at Mt. Kushigata (34.1%, Kato et al., 1993), in temperate forests at Ashu (23.3%, Kato et al., 1990) and Kibune (10.4%, Inoue et al., 1990). The difference of long-tongued bee fauna between Amami Islands and the other northern parts of Japan results in the difference of pollinators of various flowers with deep nectaries. For example, *Rhododendron tashiroi* is pollinated by bumblebees on

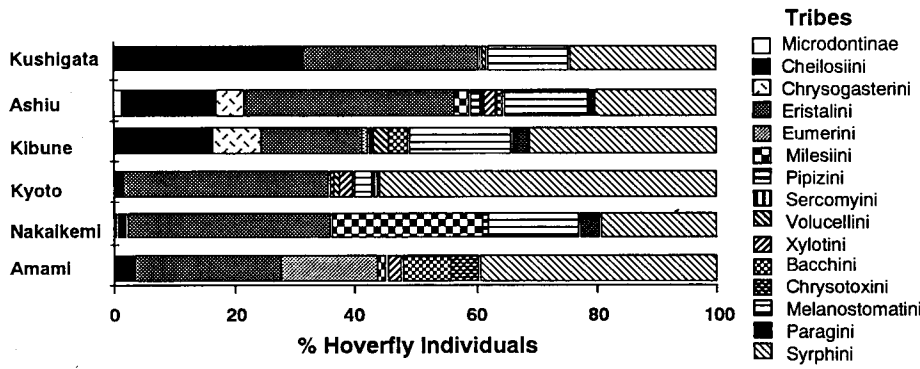

Fig. 19. A comparison of relative abundance of syrphid tribes among five localities in Japan. Data sources are as follows: Botanical Garden of Kyoto University (Kakutani et al., 1989), Kibune (Inoue et al. 1989), Ashu (Kato et al., 1989), Mt. Kushigata (Kato et al. 1993), Nakaikemi (Kato and Miura, 1996) and Amami Islands (this study).

Yaku Island (Yumoto, 1987; 1988), while it is pollinated by *Tetralonia* on Amami Island. *Tetralonia* is sometimes an important pollinator as *Bombus* in temperate habitats (Kakutani et al., 1990), and the distribution of *Tetralonia* extends to the subtropical regions where Bombus is not distributed. The difference of pollinating bee species between these islands may have resulted in morphological and ecological characters of these flowers.

In other cases, an understory perennial, *Alpinia japonica,* is pollinated by bumblebees in Kyushu (Kato unpub.), while on Amami Islands three *Alpinia* spp. were pollinated by *Amegilla* and rarely by *Xylocopa,* both of which are distributed also in tropical regions. The partnership between gingers and the long-tongued trap-lining *Amegilla* bees is widespread from Southeast Asian tropical rain forests (Kato et al., 1991; Kato, 1995; Sakai et al., 1999a) to subtropical forest in Ryukyu Archipelago.

In temperate habitats in Japan, long-tubed flowers are generally adapted to be pollinated by long-tongued bumblebees, and hawkmoths are generally nectar thefts. Thus, hawkmoth pollination system is rare there. On Amami Islands, four plant species, *Barringtonia racemosa, Cerbera manghas, Clerodendrum trichotomum* and *Musaenda parviflora,* were pollinated by hawkmoths. The last species attracted butterflies in the daytime and hawkmoths in the dawn and the evening, and the hairiness of inner wall of the corolla tube, which is regarded as adaptation to pollen dusting to lepidopteran's proboscis, is thought to have driven the evolution of dioecy from heterostyly (Naiki and Kato, 1999). In the subtropical ecosystem where bumblebees are absent, hawkmoths as well as long-tongued solitary bees are complementarily important pollinators.

Acknowledgments

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Appendix 1.

A List of Insect Species Recorded on Flowers of 117 Plant species on Amami-Oshima Islands in 1996-1999

Insect-visit records for each plant species are listed as follows: insect species, (family code: order code), date, and (number of individuals collected or observed). Plant taxa and insect taxa are arranged following the natural systems of Cronquist (1981) and Hirashima (1989), respectively. Insect order and family codes are abreviated as two and three head characters of each order and family name respectively.

Pinaceae

Pinus luchuensis (Pin1)

Bibio sp. (Bib: Di) 18-III-1997 (1); *Elaphromyia imcompleta* (Tep: Di) 18-III-1997 (1)

Lauraceae

Cinnamomum doederleinii (Lau1)

Eurystylus sauteri (Mir: He) 3-VI-1996 (1); *Harmonia yedoensis* (Coc: Co) 3-VI-1996 (1); *Scymnus sodalis* (Coc: Co) 3-VI-1996 (1); *Mordellina tsutsuii* (Mor: Co) 3-VI-1996 (1); *Oedemeronia testaceithorax* (Oed: Co) 3-VI-1996 (1); *Aphothona amamiana* (Chr: Co) 3-VI-1996 (1); sp. 6 (Bra: Hy) 3-VI-1996 (1); *Hylaeus insularum* (Col: Hy) 3-VI-1996 (1); *Lasioglossum nutilum* (Hal: Hy) 3-VI-1996 (2); sp. 10 (Emp: Di) 18-III-1997 (1); *Dioxyna sororcula* (Tep: Di) 3-VI-1996 (3); sp. 21 (Chl: Di) 3-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (2); sp. 5 (Tac: Di) 3-VI-1996 (1); sp. 6 (Tac: Di) 3-VI-1996 (1); sp. 9 (Tac: Di) 3-VI-1996 (1); sp. 10 (Tac: Di) 3-VI-1996 (1); *Nemophora umbripenis* (Inc: Le) 3-VI-1996 (1)

Litsea japonica (Lau2)

Exosoma amamiense (Chr: Co) 5-X-1996 (1); sp. 19 (Bra: Hy) 5-X-1996 (1); sp. 2 (Chi: Di) 5-X-1996 (1); sp. 1 (Psy: Di) 5-X-1996 (1); sp. 7 (Chl: Di) 5-X-1996 (3); sp. 8 (Chl: Di) 5-X-1996 (1); sp. 9 (Chl: Di) 5-X-1996 (5); sp. 1 (Dro: Di) 5-X-1996 (1); sp. 16 (Dro: Di) 5-X-1996 (1)

Litsea citriodora (Lau3)

sp. 13 (Dro: Di) 18-III-1997 (1)

Machilus thunbergii (Lau4)

sp. (Cae: Ps) 18-III-1997 (3); *Caecilius oyamai* (Cae: Ps) 18-III-1997 (4); *Leeuwenia* sp. (Phl: Th) 18-III-1997 (1); *Ampedus amamiensis* (Ela: Co) 18-III-1997 (1); *Podabrus* sp. 1 (Can: Co) 18-III-1997 (1); *Podabrus* sp. 3 (Can: Co) 18-III-1997 (2); *Monolepta chujoi* (Chr: Co) 18-III-1997 (1); sp. 4 (Cul: Di) 18-III-1997 (1); sp. 1 (Cer: Di) 18-III-1997 (1); sp. 5 (Cer: Di) 18-III-1997 (1); sp. 1 (Myc: Di) 18-III-1997 (1); sp. 2 (Sci: Di) 18-III-1997 (4); sp. 4 (Sci: Di) 18-III-1997 (1); sp. 5 (Emp: Di) 18-III-1997 (5); sp. 7 (Emp: Di) 18-III-1997 (1); sp. 11 (Emp: Di) 18-III-1997 (1); *Parasyrphus aeneostoma* (Syr: Di) 18-III-1997 (1); sp. 3 (Dro: Di) 18-III-1997 (1); sp. 9 (Dro: Di) 18-III-1997 (5); sp. 12 (Dro: Di) 18-III-1997 (2); sp. 13 (Dro: Di) 18-III-1997 (1); sp. 24 (Mus: Di) 18-III-1997 (1); *Hydropsychoides* sp. 2 (Hyd: Tr) 18-III-1997 (1)

Piperaceae

Piper kadzura (*Pip1*)

Anomalempis sp. (Emp: Di) 7-V-1997 (1); *Allobaccha nubilipennis* (Syr: Di) 7-V-1997 (1); *Siphunculina* sp. (Chl: Di) 7-V-1997 (1)

Ranunculaceae

Clematis grata var. ryukyuensis (Ran1)

Lasioglossum amamiensis (Hal: Hy) 5-X-1996 (1)

Clematis terniflora (Ran2)
Meligethes shirakii (Nit: Co) 3-VI-1996 (1); *Mordellina brunneotincta* (Mor: Co) 3-VI-1996 (2); *Exosoma amamiense* (Chr: Co) 3-VI-1996 (2); *Orthaltica shirozui* (Chr: Co) 3-VI-1996 (3); sp. 7 (Ich: Hy) 7-V-1997 (1); *Lasioglossum nutilum* (Hal: Hy) 7-V-1997 (1); sp. 4 (Sci: Di) 7-V-1997 (1): Anomalempis sp. (Emp: Di) 3-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (2), 7-V-1997 (2)

Ranunculus sieboldii (Ran3)
Liorhyssum hyalinus (Rho: He) 5-X-1996 (1); *Eumerus okinawaensis* (Syr: Di) 31-V-1999 (1), 5-X-1996 (1)

Lardizabalaceae

Stauntonia hexaphylla (Lar1)
Plectoderoides vittifrons (Ach: He) 18-III-1997 (1); *Trioza nigra* (Psy: He) 18-III-1997 (1); *Tinginotum perlatum* (Mir: He) 18-III-1997 (1); *Adelphocoris demissus* (Mir: He) 18-III-1997 (1); *Podabrus* sp. 1 (Can: Co) 18-III-1997 (1); sp. 16 (Lau: Di) 18-III-1997 (1); sp. 21 (Lau: Di) 18-III-1997 (1)

Sabiaceae

Meliosma oldhamii (Sab1)
Anthaxia moya (Bup: Co) 30-VI-1996 (5)

Meliosma rigida (Sab2)
Lygocoris sp. 1 (Mir: He) 30-VI-1996 (9); *Neolethaeus dallasi* (Lyg: He) 30-VI-1996 (7); *Attalus ryukyuanus* (Mel: Co) 30-VI-1996 (1); *Mordellina tsutsuii* (Mor: Co) 30-VI-1996 (3); *Mordellina amamiensis* (Mor: Co) 30-VI-1996 (3); *Mordellistena edashigei* (Mor: Co) 30-VI-1996 (15); *Chlamisus japonicus* (Chr: Co) 30-VI-1996 (1); sp. 16 (Bra: Hy) 30-VI-1996 (1); sp. 17 (Bra: Hy) 30-VI-1996 (1); sp. 18 (Bra: Hy) 30-VI-1996 (1); sp. 10 (Pte: Hy) 30-VI-1996 (2); sp. 1 (Enc: Hy) 30-VI-1996 (1); sp. 2 (Enc: Hy) 30-VI-1996 (1); sp. (Ela: Hy) 30-VI-1996 (1); sp. 9 (Eul: Hy) 30-VI-1996 (1); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (28); sp. 3 (Sci: Di) 30-VI-1996 (1); *Dioxyna sororcula* (Tep: Di) 30-VI-1996 (2); sp. 6 (Lau: Di) 30-VI-1996 (1); sp. 7 (Lau: Di) 30-VI-1996 (2); sp. 2 (Chl: Di) 30-VI-1996 (3); sp. 3 (Chl: Di) 30-VI-1996 (1); sp. 4 (Chl: Di) 30-VI-1996 (1); sp. 5 (Chl: Di) 30-VI-1996 (1); sp. 8 (Chl: Di) 30-VI-1996 (3); sp. 12 (Chl: Di) 30-VI-1996 (1); sp. 13 (Chl: Di) 30-VI-1996 (1); *Siphunculina* sp. (Chl: Di) 30-VI-1996 (9); sp. 22 (Chl: Di) 30-VI-1996 (1); sp. 6 (Dro: Di) 30-VI-1996 (1); sp. 6 (Mus: Di) 30-VI-1996 (2); sp. 11 (Tac: Di) 30-VI-1996 (1)

Ulmaceae

Trema orientalis (Ulm1)
Stragamia mundus (Ias: He) 31-V-1999 (1); sp. (Typ: He) 31-V-1999 (1); *Lygocoris* sp. 1 (Mir: He) 31-V-1999 (4); *Lygocoris* sp. 5 (Mir: He) 31-V-1999 (1); *Lygocoris* sp. 8 (Mir: He) 31-V-1999 (2); *Bilia japonica* (Ant: He) 31-V-1999 (1); *Callimerus ryukyuensis* (Cle: Co) 31-V-1999 (1); sp. 11 (Bra: Hy) 31-V-1999 (1); sp. 12 (Ich: Hy) 31-V-1999 (1); *Pristomyrmex pungeus* (For: Hy) 31-V-1999 (1); sp. 15 (Lau: Di) 31-V-1999 (1); sp. 9 (Mus: Di) 31-V-1999 (1)

Fagaceae

Castanopsis sieboldii subsp. leutchuensis (Fag1)
Onychostylus pallidiolus (Bla: Bl) 16-IV-1995 (1); *Anisolabis maritima* (Psa: De) 16-IV-1995 (2); sp. (Cae: Ps) 16-IV-1995 (1); *Leeuwenia pasanii* (Phl: Th) 16-IV-1995 (1); sp. 2 (Thr: Th) 18-III-1997 (3); *Betacixius* sp. (Cix: He) 16-IV-1995 (1); *Plectoderoides vittifrons* (Ach: He) 16-IV-1995 (4); *Lygocoris* sp. 1 (Mir: He) 16-IV-1995 (1); *Lygocoris* sp. 5 (Mir: He) 18-III-1997 (1); *Tinginotum perlatum* (Mir: He) 18-III-1997 (1); *Glaucias subpunctatus* (Pen: He) 16-IV-1995 (1); *Nipponosialis amamiensis* (Sia: Ne) 16-IV-1995 (1); *Ampedus amamiensis* (Ela: Co) 16-IV-1995 (4); *Stenolophus fulnicornis* (Car: Co) 16-IV-1995 (1); *Sepedophilus* sp. (Sta: Co) 16-IV-1995 (1); sp. 4 (Sta: Co) 16-IV-1995 (1); *Oxycetonia forticula forticula* (Sca: Co) 16-IV-1995 (4), 18-III-1997 (1); *Ectinohoplia gracilis* (Sca: Co) 16-IV-1995 (1); *Penthelater plebejus* (Ela: Co) 16-IV-

1995 (2); *Hayekpenthes pallidus* (Ela: Co) 16-IV-1995 (1); *Ampedus amamiensis* (Ela: Co) 16-IV-1995 (1); *Ampedus aritai* (Ela: Co) 16-IV-1995 (1); *Chatanys insularis istoi* (Ela: Co) 16-IV-1995 (1); *Prothemus ryukyuanus* (Can: Co) 16-IV-1995 (2); *Themus kazuoi* (Can: Co) 16-IV-1995 (5); *Athemus* sp. (Can: Co) 16-IV-1995 (2); *Podabrus* sp. 1 (Can: Co) 18-III-1997 (2); *Podabrus* sp. 2 (Can: Co) 16-IV-1995(9); *Podabrus* sp. 3 (Can: Co) 16-IV-1995 (9), 18-III-1997 (1); *Malthinus okinawanus* (Can: Co) 16-IV-1995 (5), 18-III-1997 (2); *Stenocallinerus prasinatus* (Cle: Co) 16-IV-1995 (1); sp. 1 (Cry: Co) 18-III-1997 (1); *Cryptogonus horishanus* (Coc: Co) 16-IV-1995 (1); *Scymnus sodalis* (Coc: Co) 16-IV-1995 (3); *Mordellina tsutsuii* (Mor: Co) 16-IV-1995 (1); *Oedemeronia testaceithorax* (Oed: Co) 16-IV-1995 (5); *Oedemeronia sexualis* (Oed: Co) 16-IV-1995(1); *Anthicus shibatai* (Ant: Co) 16-IV-1995 (1); *Anaspis shibatai* (Scr: Co) 16-IV-1995 (6), 18-III-1997 (9); *Arthromacra amamiana* (Lag: Co) 16-IV-1995 (4); *Borboresthes sauteri oshimana* (All: Co) 16-IV-1995 (2); *Allecula shibatai* (All: Co) 16-IV-1995 (11); *Allecula tenuis* (All: Co) 16-IV-1995 (2); *Formosopyrrhona satoi* (Cer: Co) 16-IV-1995 (1), 18-III-1997 (1); *Stenodryas clavigera* (Cer: Co) 16-IV-1995 (3); *Aulacophora nigripennis* (Chr: Co) 16-IV-1995 (1); *Smoragdina quadratoma culata* (Chr: Co) 16-IV-1995 (1); *Aulacophora femoralis* (Chr: Co) 16-IV-1995 (1); *Cryptocephalus perelegans* (Chr: Co) 16-IV-1995 (2); *Macrocorynus* sp. (Cur: Co) 16-IV-1995 (2); *Cyphicerus* sp. (Cur: Co) 16-IV-1995 (3); *Cyphicerus* sp. (Cur: Co) 16-IV-1995 (1); *Acalyptus* sp. ? (Cur: Co) 16-IV-1995 (1); sp. 4 (Bra: Hy) 16-IV-1995 (1); sp. 7 (Bra: Hy) 18-III-1997 (1); sp. 12 (Bra: Hy) 18-III-1997 (1); sp. 15 (Bra: Hy) 16-IV-1995 (1); sp. 20 (Bra: Hy) 16-IV-1995 (1); sp. 5 (Ich: Hy) 16-IV-1995 (1); sp. 8 (Ich: Hy) 16-IV-1995 (1); sp. 9 (Ich: Hy) 18-III-1997 (6); sp. 14 (Ich: Hy) 16-IV-1995 (3); sp. 6 (Pte: Hy) 18-III-1997 (1); sp. 7 (Pte: Hy) 18-III-1997 (1); sp. 11 (Pte: Hy) 18-III-1997 (1); sp. 1 (Cyn: Hy) 16-IV-1995 (1); *Vespa analis eisa* (Ves: Hy) 16-IV-1995 (1); *Hylaeus insularum* (Col: Hy) 16-IV-1995 (1); *Lasioglossum subopacum* (Hal: Hy) 16-IV-1995 (19); *Andrena opacifovea* (And: Hy) 16-IV-1995 (2); *Andrena opacifovea* (And: Hy) 18-III-1997 (6); *Andrena edashigei* (And: Hy) 16-IV-1995 (1); *Andrena edashigei* (And: Hy) 16-IV-1995 (1); sp. 1 (Sci: Di) 16-IV-1995 (3); *Cephalochrysa* sp. (Str: Di) 16-IV-1995 (1); *Atylotus sawadai?* (Tab: Di) 16-IV-1995 (1); sp. 2 (Emp: Di) 16-IV-1995 (1); sp. 3 (Emp: Di) 16-IV-1995 (1); sp. 4 (Emp: Di) 16-IV-1995 (2); sp. 5 (Emp: Di) 18-III-1997 (1); sp. 6 (Emp: Di) 18-III-1997 (1); sp. 9 (Emp: Di) 18-III-1997 (1); sp. 12 (Emp: Di) 18-III-1997 (1); sp. 14 (Emp: Di) 18-III-1997 (1); sp. 16 (Emp: Di) 18-III-1997 (1); *Anomalempis* sp. (Emp: Di) 18-III-1997 (1); sp. 2 (Dol: Di) 18-III-1997 (1); sp. 1 (Pho: Di) 16-IV-1995 (1); *Chalcosyrphus annulipes* (Syr: Di) 16-IV-1995 (1); *Cheilosia* sp. (Syr: Di) 18-III-1997 (1); *Eumerus okinawaensis* (Syr: Di) 16-IV-1995 (2); *Allograpta javania* (Syr: Di) 16-IV-1995 (11); sp. 1 (Lau: Di) 16-IV-1995 (1); sp. 8 (Chl: Di) 16-IV-1995 (1); sp. (Eph: Di) 18-III-1997 (1); sp. 1 (Mus: Di) 16-IV-1995 (1); *Ophyra leucostoma* (Mus: Di) 16-IV-1995 (1); *Stomorhina obsoleta* (Cal: Di) 16-IV-1995 (1), 18-III-1997 (2); sp. 1 (Sar: Di) 16-IV-1995 (1); sp. 3 (Sar: Di) 16-IV-1995 (1); sp. 4 (Sar: Di) 16-IV-1995 (1); sp. 1 (Tac: Di) 18-III-1997 (1); sp. 3 (Tac: Di) 16-IV-1995 (1); sp. 14 (Tac: Di) 18-III-1997 (1); sp. (Hyd: Tr) 16-IV-1995 (1)

Chenopodiaceae

Salsola komarovii (Chel)

Chrysotoxum testaceum (Syr: Di) 10-XII-1996 (1)

Polygonaceae

Persicaria chinensis (Pol1)

Athalia japonica (Ten: Hy) 10-XII-1996 (2); *Dioxyna sororcula* (Tep: Di) 10-XII-1996 (1); *Stictomyia* sp. (Oti: Di) 10-XII-1996 (1); sp. (Ant: Di) 10-XII-1996 (1); sp. 2 (Sar: Di) 10-XII-1996 (1)

Reynoutria japonica (Pol2)

Mordellistena edashigei (Mor: Co) 5-X-1996 (2); *Exosoma amamiense* (Chr: Co) 5-X-1996 (5); *Lasioglossum subopacum* (Hal: Hy) 5-X-1996 (2); sp. 2 (Cul: Di) 5-X-1996 (1); *Allobaccha nubilipennis* (Syr: Di) 5-X-1996 (1)

Theaceae

Schima wallichii (The1)

Colpodes ishidai (Car: Co) 3-VI-1996 (1); *Lebia purkynei* (Car: Co) 3-VI-1996 (1); *Oxycetonia forticula forticula* (Sca: Co) 3-VI-1996 (1), 31-V-1999 (1); *Ectinohoplia gracilis* (Sca: Co) 31-V-1999 (2); *Anthaxia moya* (Bup: Co) 3-VI-1996 (1); *Trogoderma* sp. (Der: Co) 31-V-1999 (1); *Epuraea commutata* (Nit: Co) 3-VI-1996 (1); *Meligethes shirakii* (Nit: Co) 3-VI-1996 (2); *Harmonia yedoensis* (Coc: Co) 3-VI-1996 (1); *Cryptogonus horishanus* (Coc: Co) 4-VII-1999 (1); *Menochilus sexmaculatus* (Coc: Co) 31-V-1999 (1); *Mordellina tsutsuii* (Mor: Co) 4-VII-1999 (3); *Mordellina amamiensis* (Mor: Co) 3-VI-1996 (6); *Tolidopalpus galloisi* (Mor: Co) 4-VII-1999 (2); *Chloridolum leochooanum* (Cer: Co) 4-VII-1999 (1); *Exosoma amamiense* (Chr: Co) 3-VI-1996 (2); *Demotina major* (Chr: Co) 3-VI-1996 (1); *Choragus* sp. (Ant: Co) 3-VI-1996 (1); *Acalyptus* sp. ? (Cur: Co) 3-VI-1996 (1); *Anthonomus* sp. (Cur: Co) 3-VI-1996 (1); *Anisolabis maritima* (Psa: De) 3-VI-1996 (1); *Vespa analis eisa* (Ves: Hy) 3-VI-1996 (3); *Megachile nipponica amamiensis* (Meg: Hy) 4-VII-1999 (1); *Xylocopa amamensis* (Ant: Hy) 3-VI-1996 (1); *Phytomia zonata* (Syr: Di) 3-VI-1996 (4); *Eristalis tenax* (Syr: Di) 3-VI-1996 (5); *Didea alneti* (Syr: Di) 4-VII-1999 (1); sp. 11 (Lau: Di) 3-VI-1996 (1); Mediza sp. (Mil: Di) 3-VI-1996 (2); sp. 17 (Chl: Di) 3-VI-1996 (1); sp. 18 (Chl: Di) 3-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (12), 31-V-1999 (4), 4-VII-1999 (2); *Papilio helenus nicconicoleus* (Pap: Le) 31-V-1999 (1); *Graphium sarpedon nipponum* (Pap: Le) 31-V-1999(1); *Nacaduba kurava septentrionalis* (Lyc: Le) 31-V-1999 (1); *Parantica sita niphonica* (Dan: Le) 31-V-1999 (1); *Vanessa indica* (Nym: Le) 31-V-1999 (1); *Chrisaeglia magnifica* (Arc: Le) 31-V-1999 (1)

Eurya japonica (The2)

Eusphalerum lewisi? (Sta: Co) 17-II-1999 (1)

Actinidiaceae

Actinidia rufa (Act1)

Xylocopa amamensis (Ant: Hy) 16-IV-1995 (1)

Elaeocarpaceae

Elaeocarpus japonicus (Ela1)

Lygocoris sp. 1 (Mir: He) 16-IV-1995 (2); *Carpelius exigus?* (Sta: Co) 16-IV-1995 (1); *Oxycetonia forticula forticula* (Sca: Co) 16-IV-1995 (1); *Ectinohoplia gracilis* (Sca: Co) 16-IV-1995 (1); *Themus kazuoi* (Can: Co) 16-IV-1995 (1); *Athemus* sp. (Can: Co) 16-IV-1995 (1); *Podabrus* sp. 3 (Can: Co) 16-IV-1995 (1); *Malthinellus chujoi* (Can: Co) 16-IV-1995 (2); *Oedemeronia testaceithorax* (Oed: Co) 16-IV-1995 (2); *Borboresthes sauteri oshimana* (All: Co) 16-IV-1995 (1); *Allecula shibatai* (All: Co) 16-IV-1995 (4); *Macrocorynus* sp. (Cur: Co) 16-IV-1995 (1); sp. 15 (Bra: Hy) 16-IV-1995 (2); sp. 3 (Ich: Hy) 16-IV-1995 (1); sp. 14 (Ich: Hy) 16-IV-1995 (1); *Ectemnius confinis?* (Sph: Hy) 16-IV-1995 (1); *Hylaeus insularum* (Col: Hy) 16-IV-1995 (1); *Lasioglossum nutilum* (Hal: Hy) 16-IV-1995 (1); *Andrena opacifovea* (And: Hy) 16-IV-1995 (4); *Andrena edashigei* (And: Hy) 16-IV-1995 (1); *Andrena edashigei* (And: Hy) 16-IV-1995 (2); *Andrena knuthi* (And: Hy) 16-IV-1995 (3); *Andrena hirashimai* (And: Hy) 16-IV-1995 (2); sp. 1 (Sci: Di) 16-IV-1995 (1); sp. 3 (Emp: Di) 16-IV-1995 (1); *Allograpta javania* (Syr: Di) 16-IV-1995 (5); sp. 2 (Lau: Di) 16-IV-1995 (1); sp. 23 (Lau: Di) 16-IV-1995 (1); Mediza sp. (Mil: Di) 16-IV-1995 (1); sp. 5 (Chl: Di) 16-IV-1995 (5); sp. 19 (Chl: Di) 16-IV-1995 (1); sp. 21 (Chl: Di) 16-IV-1995 (1); sp. 9 (Dro: Di) 16-IV-1995 (1); sp. 8 (Mus: Di) 16-IV-1995 (1); sp. 18 (Mus: Di) 16-IV-1995 (1); *Stomorhina obsoleta* (Cal: Di) 16-IV-1995 (3); *Chrysomya pinguis* (Cal: Di) 16-IV-1995 (3); sp. 1 (Sar: Di) 16-IV-1995 (1); sp. 2 (Tac: Di) 16-IV-1995 (1); sp. 7 (Tac: Di) 16-IV-1995 (1); *Papilio memnon thunbergii* (Pap: Le) 16-IV-1995 (1)

Elaeocarpus sylvestris var. ellipticus (Ela2)

Onychostylus pallidiolus (Bla: Bl) 30-VI-1996 (1); *Ricania japonica* (Ric: He) 30-VI-1996 (1); *Euscartopsis zonalis* (Cer: He) 30-VI-1996 (1); *Matsumurella kogotensis* (Del: He) 30-VI-1996 (3); *Lygocoris* sp. 1 (Mir: He) 30-VI-1996 (7); *Eurystylus sauteri* (Mir: He) 30-VI-1996 (1); *Lygocoris* sp. 5 (Mir: He) 30-VI-1996 (1); *Neolethaeus dallasi* (Lyg: He) 30-VI-1996 (1); *Chrysopa* sp. 1 (Chr: Ne) 30-VI-1996 (1); *Chrysodema lewisii* (Bup: Co) 30-VI-1996 (1);

Anthaxia moya (Bup: Co) 30-VI-1996 (1); *Chiagasinus vittiger rufomarginatus* (Ela: Co) 30-VI-1996 (1); *Orphinus quadrimaculatus* (Der: Co) 30-VI-1996 (1); *Psamoecus triguttatus* (Sil: Co) 30-VI-1996 (1); sp. (Sil: Co) 30-VI-1996 (1); *Lemnia biplagiata* (Coc: Co) 30-VI-1996 (1); *Macratria griseosellata* (Ant: Co) 30-VI-1996 (1); *Chlorophorus quinquefasciatus* (Cer: Co) 30-VI-1996 (2); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (2); *Phytomia zonata* (Syr: Di) 30-VI-1996 (1); sp. 3 (Lau: Di) 30-VI-1996 (1); sp. 4 (Lau: Di) 30-VI-1996 (1); sp. 5 (Lau: Di) 30-VI-1996 (2); sp. 8 (Lau: Di) 30-VI-1996 (1)

Sterculiaceae

Heritiera littoralis (Stel)

sp. (Del: He) 3-VI-1996 (1); *Idiocerus* sp. (Idi: He) 31-V-1999 (2); *Nirvana orientalis* (Nir: He) 3-VI-1996 (1); *Nesiope ornata* (Psy: He) 3-VI-1996 (12), 31-V-1999 (16); *Lygocoris* sp. 1 (Mir: He) 31-V-1999 (1); *Campylomma lividicornis* (Mir: He) 31-V-1999 (5); *Chrysopa* sp. 2 (Chr: Ne) 31-V-1999 (1); *Cyphon sinuosus* (Hel: Co) 3-VI-1996 (1); *Anadastus melanosternus* (Lan: Co) 3-VI-1996 (1); *Glenea chlorospila* (Cer: Co) 3-VI-1996 (1); sp. 1(Enc: Hy) 3-VI-1996 (1); *Vespa analis eisa* (Ves: Hy) 3-VI-1996 (2); *Vespula shidai amamiana* (Ves: Hy) 3-VI-1996 (2); *Tachytes?* sp. (Sph: Hy) 3-VI-1996 (1); *Apis cerana* (Api: Hy) 3-VI-1996 (1); *Philophyla superflucta* (Tep: Di) 3-VI-1996 (1); sp. 18 (Chl: Di) 3-VI-1996 (1); *Siphunculina* sp. (Chl: Di) 3-VI-1996 (1); sp. 4 (Dro: Di) 3-VI-1996 (1); *Lucilia porphyrina* (Cal: Di) 3-VI-1996 (1); sp. 2 (Geo: Le) 31-V-1999 (1)

Malvaceae

Hibiscus hamabo (Mal1)

Dysderus philippinus (Pyr: He) 30-VI-1996 (1); *Lithurge collaris* (Meg: Hy) 30-VI-1996 (2)

Hibiscus makinoi (Mal2)

Oliarus okinawanus (Cix: He) 5-X-1996 (2); sp. 10 (Bra: Hy) 5-X-1996 (1); *Amegilla dulcifera subflavescens* (Ant: Hy) 5-X-1996 (1); *Xylocopa amamensis* (Ant: Hy) 5-X-1996 (2); *Hymenia recurvalis* (Pyr: Le) 5-X-1996 (1); *Pelopidas mathias oberthueri* (Hes: Le) 5-X-1996 (1); *Macroglossum corythus* (Sph: Le) 5-X-1996 (3)

Hibiscus tiliaceus (Mal3)

Lithurge collaris (Meg: Hy) 30-VI-1996 (2), 4-VII-1999 (2)

Lecythidaceae

Barringtonia racemosa (Lec1)

Macroglossum corythus (Sph: Le) 7-VIII-1996 (1)

Violaceae

Viola pseudo-japonica (Vio1)

Tetralonia okinawae okinawae (Ant: Hy) 18-III-1997 (1)

Cucurbitaceae

Melothria liukiuensis (Cuc1)

Haptoncus concolor? (Nit: Co) 10-XII-1996 (1)

Brassicaceae

Brassica campestris (Bra1)

Apis mellifera (Api: Hy) 18-III-1997 (1); sp. 3 (Lau: Di) 18-III-1997 (1); sp. 4 (Lau: Di) 18-III-1997 (1); *Stomorhina obsoleta* (Cal: Di) 18-III-1997 (8)

Ericaceae

Vaccinium wrightii (Eri2)

Tetralonia okinawae okinawae (Ant: Hy) 7-V-1997 (1); *Xylocopa amamensis* (Ant: Hy) 16-IV-1995 (1)

Rhododendron tashiroi (Eri3)
Tetralonia okinawae okinawae (Ant: Hy) 18-III-1997 (1)

Ebenaceae

Diospyrus japonica (Ebe1)
Carpelius exigus? (Sta: Co) 3-VI-1996 (1); *Epuraea dentipes* (Nit: Co) 3-VI-1996 (1); *Xylocopa amamensis* (Ant: Hy) 3-VI-1996 (5); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (1)

Styracaceae

Styrax japonica (Sty1)
Trioza nigra (Psy: He) 17-II-1999 (1); *Adelphocoris demissus* (Mir: He) 18-III-1997 (1); *Carpelimus siamensis* (Sta: Co) 17-II-1999 (1); *Cossonus* sp. (Cur: Co) 17-II-1999 (1); *Vespula shidai amamiana* (Ves: Hy) 17-II-1999 (1); *Andrena esakii* (And: Hy) 17-II-1999 (2); *Tetralonia okinawae okinawae* (Ant: Hy) 16-IV-1995 (1), 18-III-1997 (1); *Xylocopa amamensis* (Ant: Hy) 16-IV-1995 (1); sp. 3 (Cer: Di) 17-II-1999 (1); *Bombylius major* (Bom: Di) 17-II-1999(1); sp. 17 (Emp: Di) 17-II-1999 (1); *Anomalempis* sp. (Emp: Di) 17-II-1999 (2); sp. 20 (Emp: Di) 17-II-1999 (1); sp. 1 (Dol: Di) 18-III-1997 (1); *Episyrphus balteata* (Syr: Di) 17-II-1999 (2); sp. 6 (Dro: Di) 17-II-1999 (1); sp. 14 (Mus: Di) 17-II-1999 (2)

Symplocaceae

Symplocos microcalyx (Sym3)
Caecilius oyamai (Cae: Ps) 16-IV-1995 (1), 18-III-1997 (1); *Tituria angulata* (Led: He) 16-IV-1995 (1); *Andrallus spindeus* (Pen: He) 16-IV-1995 (1); *Elasmostethus humeralis* (Pen: He) 16-IV-1995 (1); *Carpelius exigus?* (Sta: Co) 16-IV-1995 (10); *Habroloma liukiuense* (Bup: Co) 18-III-1997 (1); *Ampedus amamiensis* (Ela: Co) 18-III-1997 (10); *Prothemus ryukyuanus* (Can: Co) 16-IV-1995 (1); *Podabrus ihai* (Can: Co) 16-IV-1995 (1); *Podabrus* sp. 2 (Can: Co) 16-IV-1995 (2); *Anthicus shibatai* (Ant: Co) 16-IV-1995 (6); *Allecula shibatai* (All: Co) 16-IV-1995 (3); sp. 3 (Pte: Hy) 16-IV-1995 (1); *Technomyrmex albipes* (For: Hy) 16-IV-1995 (1); *Andrena amamiensis* (And: Hy) 16-IV-1995 (3); sp. 4 (Emp: Di) 16-IV-1995 (2); sp. 7 (Emp: Di) 18-III-1997 (3); sp. 19 (Emp: Di) 18-III-1997 (1); *Senopterina* sp. (Pla: Di) 16-IV-1995 (1); sp. 5 (Chl: Di) 16-IV-1995 (1); sp. 8 (Chl: Di) 16-IV-1995 (1); *Siphunculina* sp. (Chl: Di) 16-IV-1995 (2); sp. 10 (Dro: Di) 16-IV-1995 (1)

Myrsinaceae

Ardisia pusilla (Myr1)
Lasioglossum subopacum (Hal: Hy) 30-VI-1996 (1)

Ardisia quinquegona (Myr2)
Lygocoris sp. 1 (Mir: He) 30-VI-1996 (2); *Eurystylus sauteri* (Mir: He) 30-VI-1996 (1); *Popillia insularis* (Sca: Co) 30-VI-1996 (2); sp. 1 (Ela: Co) 30-VI-1996 (1); *Mordellina tsutsuii* (Mor: Co) 30-VI-1996 (11); *Leptura ochraceofasciata amamiana* (Cer: Co) 30-VI-1996 (1); *Pseudiphra obscura* (Cer: Co) 30-VI-1996 (1); *Nodina chalcosoma* (Chr: Co) 30-VI-1996 (2); *Cryptocephalus perelegans* (Chr: Co) 30-VI-1996 (1); *Xanthonia placida* (Chr: Co) 30-VI-1996 (2); *Okinawepipona kogimai nagasei* (Eum: Hy) 30-VI-1996 (1); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (1); *Amegilla dulcifera subflavescens* (Ant: Hy) 30-VI-1996 (1); *Xylocopa amamensis* (Ant: Hy) 30-VI-1996 (2); *Episyrphus balteata* (Syr: Di) 30-VI-1996 (1); sp. 8 (Chl: Di) 30-VI-1996 (1); sp. 15 (Chl: Di) 30-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 30-VI-1996 (2); *Nacaduba kurava septentrionalis* (Lyc: Le) 30-VI-1996 (1)

Ardisia sieboldii (Myr3)
Deferunda rubrostigma (Ach: He) 30-VI-1996 (1); *Lygocoris* sp. 1 (Mir: He) 31-V-1999 (5); *Eurystylus sauteri* (Mir: He) 31-V-1999 (1); *Attalus ryukyuanus* (Mel: Co) 30-VI-1996 (3); *Haptoncus concolor?* (Nit: Co) 31-V-1999 (2); sp. 2 (Cry: Co) 31-V-1999 (1); *Cryptogonus orbiculus* (Coc: Co) 30-VI-1996 (1); *Mordellina polleola* (Mor: Co) 31-V-1999 (11); *Eobia cinereipennis* (Oed: Co) 31-V-1999 (1); *Borboresthes sauteri oshimana* (All: Co) 31-V-1999 (1); *Cryptocephalus perelegans* (Chr: Co) 30-VI-1996 (1); *Xanthonia placida* (Chr: Co) 30-VI-1996

(7); sp. 8 (Bra: Hy) 30-VI-1996 (3); sp. 9 (Bra: Hy) 30-VI-1996 (1); *Stenodynerus kushigemati tsunekii* (Eum: Hy) 31-V-1999 (1); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (6); *Xylocopa amamensis* (Ant: Hy) 30-VI-1996 (1), 4-VII-1999 (3); *Phytomia zonata* (Syr: Di) 3-VI-1996 (1); *Eristalinus quinquestriatum* (Syr: Di) 31-V-1999 (1); sp. 1 (Dro: Di) 31-V-1999 (1); *Stomorhina obsoleta* (Cal: Di) 31-V-1999 (1), 4-VII-1999 (2); *Nacaduba kurava septentrionalis* (Lyc: Le) 30-VI-1996 (1)

Maesa tenera (Myr4)

Caecilius oyamai (Cae: Ps) 18-III-1997 (2); *Endelus opacipennis* (Bup: Co) 18-III-1997 (1); *Ampedus amamiensis* (Ela: Co) 18-III-1997 (1); *Anaspis shibatai* (Scr: Co) 18-III-1997 (4); *Monolepta chujoi* (Chr: Co) 18-III-1997 (2); sp. 8 (Eul: Hy) 18-III-1997 (1); sp. 6 (Sci: Di) 18-III-1997 (1); sp. 5 (Emp: Di) 18-III-1997 (8); sp. 8 (Emp: Di) 18-III-1997 (1); *Anomalempis* sp. (Emp: Di) 18-III-1997 (1); sp. 3 (Pho: Di) 18-III-1997 (2); *Cheilosia* sp. (Syr: Di) 18-III-1997 (1); sp. 1 (Dro: Di) 18-III-1997 (1); sp. 6 (Dro: Di) 18-III-1997 (1); sp. 15 (Mus: Di) 18-III-1997 (1); sp. 23 (Mus: Di) 18-III-1997 (1)

Myrsine seguinii (Myr5)

sp. 2 (Emp: Di) 16-IV-1995 (1)

Primulaceae

Lysimachia mauritiana (Pri1)

Attalus chujoanus (Mel: Co) 18-III-1997 (3); sp. 1 (For: Hy) 18-III-1997 (2); *Episyrphus balteata* (Syr: Di) 18-III-1997 (1); *Chrysotoxum testaceum* (Syr: Di) 18-III-1997 (1); *Stomorhina obsoleta* (Cal: Di) 18-III-1997 (3)

Pittosporaceae

Pittosporum tobira (Pit1)

Attalus chujoanus (Mel: Co) 18-III-1997 (24); *Cryptogonus horishanus* (Coc: Co) 18-III-1997 (1); *Oedemeronia testaceithorax* (Oed: Co) 18-III-1997 (1); *Oedemeronia sexualis* (Oed: Co) 18-III-1997 (6); *Allecula tenuis* (All: Co) 18-III-1997 (1); *Nodena* sp. (Chr: Co) 18-III-1997 (1); *Lasioglossum* sp. 1 (Hal: Hy) 18-III-1997 (1); *Tetralonia okinawae okinawae* (Ant: Hy) 16-IV-1995 (4), 18-III-1997 (3); *Nemophora aurifera* (Inc: Le) 18-III-1997 (2); *Choaspes benjaminii japonica* (Hes: Le) 16-IV-1995 (1); *Papilio helenus nicconicoleus* (Pap: Le) 16-IV-1995 (1); *Papilio bianor amamiensis* (Pap: Le) 16-IV-1995 (1); *Papilio protenor demetrius* (Pap: Le) 16-IV-1995 (1); *Graphium sarpedon nipponum* (Pap: Le) 18-III-1997 (2)

Hydrangeaceae

Deutzia naseana (Hyd1)

Kandyosilis mucronata (Can: Co) 16-IV-1995 (1); *Oomorphoides loochooensis* (Chr: Co) 16-IV-1995 (1); *Tychius* sp. (Cur: Co) 16-IV-1995 (2); sp. 11 (Ich: Hy) 18-III-1997 (1); sp. 15 (Ich: Hy) 16-IV-1995 (1); sp. 1 (Eul: Hy) 16-IV-1995 (1); *Andrena edashigei* (And: Hy) 16-IV-1995 (8); *Andrena edashigei* (And: Hy) 16-IV-1995 (6); *Andrena amamiensis* (And: Hy) 16-IV-1995 (14); *Tetralonia okinawae okinawae* (Ant: Hy) 16-IV-1995 (1); *Episyrphus balteata* (Syr: Di) 16-IV-1995 (2); *Eumerus okinawaensis* (Syr: Di) 16-IV-1995 (1); sp. 3 (Mus: Di) 16-IV-1995 (1); *Papilio helenus nicconicoleus* (Pap: Le) 16-IV-1995 (1); *Graphium sarpedon nipponum* (Pap: Le) 16-IV-1995 (1); *Vanessa indica* (Nym: Le) 16-IV-1995 (1)

Crassulaceae

Sedum formosanum (Cra1)

Lasioglossum sp. 2 (Hal: Hy) 7-V-1997 (2); *Lasioglossum amamiensis* (Hal: Hy) 7-V-1997 (1)

Rosaceae

Rhaphiolepis indica var. *umbellata* (Ros1)

Tetralonia okinawae okinawae (Ant: Hy) 16-IV-1995 (4)

Rubus sieboldii (Ros2)
Tetralonia okinawae okinawae (Ant: Hy) 16-IV-1995 (1), 18-III-1997 (1); sp. 1 (Tip: Di) 16-IV-1995 (1)

Rubus croceacanthus (Ros3)
Apis cerana (Api: Hy) 17-II-1999 (3)

Rubus grayanus (Ros4)
Eumerus okinawaensis (Syr: Di) 18-III-1997 (1)

Caesarpiniaceae

Bauhinia japonica (Leg1)
Graphium sarpedon nipponum (Pap: Le) 30-VI-1996 (1)

Fabaceae

Canavalia lineata (Leg3)
Graphosoma rubrolineatum (Pen: He) 7-VIII-1996 (1); *Megachile okinawana* (Meg: Hy) 7-VIII-1996 (1); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (1)

Vigna marina (Leg5)
Chrysodema lewisii (Bup: Co) 7-VIII-1996 (1); sp. 23 (Bra: Hy) 7-VIII-1996 (1); *Polistes japonicus japonicus* (Ves: Hy) 7-VIII-1996 (1); *Hylaeus insularum* (Col: Hy) 7-VIII-1996 (1); *Megachile okinawana* (Meg: Hy) 7-VIII-1996 (1); *Ceratina satoi* (Ant: Hy) 30-VI-1996 (1)

Maackia tashiroi (Leg7)
Chalicodoma sculpturalis (Meg: Hy) 4-VII-1999 (1); *Chalicodoma disjunctiformis* (Meg: Hy) 4-VII-1999 (5); *Xylocopa amamensis* (Ant: Hy) 4-VII-1999 (1)

Ormocarpum cochinchinense (Leg8)
Chalicodoma sculpturalis (Meg: Hy) 4-VII-1999 (1); sp. (Pyr: Le) 4-VII-1999 (1)

Lythraceae

Lagerstroemia subcostata (Lyt1)
Psococerastis sp. 1 (Pso: Ps) 4-VII-1999 (1); *Mesepora onukii* (Tro: He) 7-VIII-1996 (3); *Euricania ocellus* (Ric: He) 7-VIII-1996 (7); *Lygocoris* sp. 1 (Mir: He) 4-VII-1999 (7), 7-VIII-1996 (3); *Eurystylus sauteri* (Mir: He) 7-VIII-1996 (2); *Lygocoris* sp. 3 (Mir: He) 7-VIII-1996 (1); *Anthocoris miyamotoi* (Ant: He) 4-VII-1999 (1); *Eocanthecoma kyushuensis* (Pen: He) 4-VII-1999 (1); *Carpelius exigus?* (Sta: Co) 7-VIII-1996 (1); *Cyphon* sp. (Hel: Co) 7-VIII-1996 (1); *Habroloma nixillum insulicola* (Bup: Co) 4-VII-1999 (2), 7-VIII-1996 (1); *Scymnus sodalis* (Coc: Co) 7-VIII-1996 (1); *Mordellina tsutsuii* (Mor: Co) 7-VIII-1996 (1); *Macratria griseosellata* (Ant: Co) 7-VIII-1996 (1); *Euseboides matsudai* (Cer: Co) 4-VII-1999 (1); *Oomorphoides* sp. (Chr: Co) 7-VIII-1996 (1); *Technomyrmex albipes* (For: Hy) 4-VII-1999 (1); *Vespa analis eisa* (Ves: Hy) 4-VII-1999 (1); *Hylaeus insularum* (Col: Hy) 4-VII-1999 (1), 7-VIII-1996 (7); *Lasioglossum* sp. 2 (Hal: Hy) 4-VII-1999 (1); *Nomia pavonula* (Hal: Hy) 4-VII-1999 (3); *Eumerus okinawaensis* (Syr: Di) 4-VII-1999 (1); *Milesia oshimaensis* (Syr: Di) 4-VII-1999 (1); *Xylota annulata* (Syr: Di) 4-VII-1999 (1); *Eristalinus viridis* (Syr: Di) 4-VII-1999 (1); *Stomorhina obsoleta* (Cal: Di) 4-VII-1999 (7), 7-VIII-1996 (5); *Nacaduba kurava septentrionalis* (Lyc: Le) 7-VIII-1996 (1)

Melastomataceae

Blastus cochinchinensis (Mel1)
Allobaccha nubilipennis (Syr: Di) 7-VIII-1996 (1)

Bredia hirsuta (Mel2)
Macrocorynus sp. (Cur: Co) 5-X-1996 (1); *Lasioglossum subopacum* (Hal: Hy) 5-X-1996 (2); *Allobaccha nubilipennis* (Syr: Di) 5-X-1996 (2); sp. 3 (Dro: Di) 5-X-1996 (1); sp. 16 (Dro: Di) 5-X-1996 (1)

Melastoma candidum (Mel3)
sp. 6 (Ich: Hy) 30-VI-1996 (1); *Lasioglossum subopacum* (Hal: Hy) 4-VII-1999 (1); *Nomia pavonula* (Hal: Hy) 4-VII-1999 (3); *Amegilla dulcifera subflavescens* (Ant: Hy) 30-VI-1996 (1), 4-VII-1999 (1); *Eumerus okinawaensis* (Syr: Di) 4-VII-1999 (5)

Rhizophoraceae

Kandelia candel (Rhi1)
Mesepora onukii (Tro: He) 7-VIII-1996 (4); *Amegilla dulcifera subflavescens* (Ant: Hy) 7-VIII-1996 (4); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (6); *Stomorhina obsoleta* (Cal: Di) 7-VIII-1996 (1); *Hydropsychoides* sp. 1 (Hyd: Tr) 7-VIII-1996 (1); *Conogethes punctiberalis* (Pyr: Le) 7-VIII-1996 (1); *Spodoptera litura* (Noc: Le) 7-VIII-1996 (1)

Aquifoliaceae

Ilex integra (Aqu1)
Onychostylus pallidiolus (Bla: Bl) 3-VI-1996 (1); *Carpelius exigus?* (Sta: Co) 3-VI-1996 (1); *Anthaxia moya* (Bup: Co) 3-VI-1996 (1); *Haptoncurina motschulskii* (Nit: Co) 3-VI-1996 (1); *Oedemeronia testaceithorax* (Oed: Co) 3-VI-1996 (2); *Exosoma amamiense* (Chr: Co) 3-VI-1996 (1); sp. 5 (Bra: Hy) 3-VI-1996 (1); sp. 2 (Pte: Hy) 3-VI-1996 (1); sp. 9 (Pte: Hy) 3-VI-1996 (1); sp. 4 (Eul: Hy) 3-VI-1996 (1); *Lasioglossum nutilum* (Hal: Hy) 3-VI-1996 (1); *Xylocopa amamensis* (Ant: Hy) 3-VI-1996 (1); *Microchrysa flaviventris* (Str: Di) 3-VI-1996 (1); *Eristalinus arvorum?* (Syr: Di) 3-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (17); sp. 15 (Tac: Di) 3-VI-1996 (1); sp. (Oec: Le) 3-VI-1996 (1); *Celastrina argiolus ladonides* (Lyc: Le) 3-VI-1996 (1)

Euphorbiaceae

Antidesma japonicum (Eup1)
sp. 12 (Pte: Hy) 31-V-1999 (1); sp. 6 (Eul: Hy) 31-V-1999 (1); sp. 2 (Cer: Di) 31-V-1999 (1); sp. 4 (Cer: Di) 31-V-1999 (3); sp. 1 (Chi: Di) 31-V-1999 (1); sp. 2 (Cec: Di) 31-V-1999 (1); sp. 1 (Sci: Di) 31-V-1999 (1); sp. 12 (Dro: Di) 31-V-1999 (1); sp. (Sph: Di) 31-V-1999 (3); sp. 3 (Mus: Di) 31-V-1999 (2); sp. 22 (Mus: Di) 31-V-1999 (2)

Glochidion acuminatum (Eup3)
Anisolabis maritima (Psa: De) 3-VI-1996 (1); *Caecilius oyamai* (Cae: Ps) 31-V-1999 (1); *Stenopsocus* sp. (Ste: Ps) 31-V-1999 (1); sp. (Ste: Ps) 31-V-1999 (1); sp. (Ste: Ps) 3-VI-1996 (1); *Lachesilla* sp. (Lac: Ps) 3-VI-1996 (2); *Betacixius* sp. (Cix: He) 31-V-1999 (1); *Oliarus okinawanus*] (Cix: He) 31-V-1999 (1); *Deferunda rubrostigma* (Ach: He) 3-VI-1996 (1); *Eutrichosiphum pasaniae* (Aph: He) 7-V-1997 (1); *Eurystylus sauteri* (Mir: He) 3-VI-1996 (1); *Lygocoris* sp. 5 (Mir: He) 7-V-1997 (1); *Campylomma lividicornis* (Mir: He) 31-V-1999 (1); *Colpodes ishidai* (Car: Co) 31-V-1999 (1); sp. 1 (Ela: Co) 31-V-1999 (1); *Cryptogonus horishanus* (Coc: Co) 7-V-1997 (1); *Scymnus sodalis* (Coc: Co) 7-V-1997 (1); *Scymnus miyatakei* (Coc: Co) 7-V-1997 (1); *Mordellina brunneotincta* (Mor: Co) 31-V-1999 (1); *Allecula shibatai* (All: Co) 31-V-1999 (1); *Cersium fuscum* (Cer: Co) 3-VI-1996 (1); *Exosoma amamiense* (Chr: Co) 3-VI-1996 (1); *Aphothona foudrasi* (Chr: Co) 31-V-1999 (2); *Cryptocephalus perelegans* (Chr: Co) 3-VI-1996 (1); *Neocrepidodera recticollis* (Chr: Co) 3-VI-1996 (1); *Monolepta chujoi* (Chr: Co) 31-V-1999 (13); sp. 1 (Bra: Hy) 31-V-1999 (1); sp. 15 (Bra: Hy) 3-VI-1996 (1); sp. 22 (Bra: Hy) 3-VI-1996 (1); sp. 25 (Bra: Hy) 31-V-1999 (1); sp. 10 (Ich: Hy) 7-V-1997 (1); sp. 13 (Ich: Hy) 31-V-1999 (1); sp. 1 (Pte: Hy) 3-VI-1996 (1); sp. 8 (Pte: Hy) 31-V-1999 (1); sp. 13 (Pte: Hy) 7-V-1997 (1); sp. 1 (Enc: Hy) 3-VI-1996 (2), 31-V-1999 (1), 7-V-1997 (7); sp. 2 (Eul: Hy) 7-V-1997 (1); sp. 7 (Eul: Hy) 31-V-1999 (1); *Paratrechina flavipes* (For: Hy) 3-VI-1996 (1); *Anoplolepis longipes* (For: Hy) 31-V-1999 (1); *Vespula shidai amamiana* (Ves: Hy) 31-V-1999 (1); *Tanyptera* sp. (Tip: Di) 31-V-1999 (1); sp. 1 (Sci: Di) 7-V-1997 (1); sp. 2 (Sci: Di) 31-V-1999 (1); sp. 4 (Sci: Di) 7-V-1997 (2); sp. 5 (Sci: Di) 7-V-1997 (1); sp. 7 (Sci: Di) 31-V-1999 (1), 7-V-1997 (2); sp. 1 (Psy: Di) 31-V-1999 (1); sp. 13 (Emp: Di) 7-V-1997 (1); *Anomalempis* sp. (Emp: Di) 31-V-1999 (1), 7-V-1997 (1); *Xylota coquilletti amamiensis* (Syr: Di) 31-V-1999 (1); *Dioxyna sororcula* (Tep: Di) 3-VI-1996 (2); *Sphenella sinensis* (Tep: Di) 3-VI-1996 (1); sp. 4 (Lau: Di) 7-V-1997 (1); sp. 8 (Lau: Di) 31-V-1999 (1); sp. 12 (Lau: Di) 31-V-1999 (2); sp. 12

(Lau: Di) 31-V-1999 (2); sp. 14 (Lau: Di) 31-V-1999 (1); sp. 17 (Lau: Di) 31-V-1999 (1); sp. 19 (Lau: Di) 7-V-1997 (1); sp. 24 (Lau: Di) 31-V-1999 (1); sp. 1 (Dro: Di) 31-V-1999 (1); sp. 4 (Dro: Di) 31-V-1999 (1); sp. 6 (Dro: Di) 31-V-1999 (1); sp. 17 (Dro: Di) 31-V-1999 (1); sp. 4 (Mus: Di) 7-V-1997 (1); sp. 17 (Mus: Di) 31-V-1999 (1); Diphtheroptila sp. (Gra: Le) 16-IV-1995 (6); sp. 1 (Geo: Le) 31-V-1999 (1)

Glochidion obovatum (Eup4)

Psococerastis sp. 2 (Pso: Ps) 31-V-1999 (1); *Psococerastis* sp. 3 (Pso: Ps) 31-V-1999 (1); *Geisha distinctissima* (Fla: He) 4-VII-1999 (1); *Euscartopsis zonalis* (Cer: He) 3-VI-1996 (2); *Gargara genistae* (Mem: He) 3-VI-1996 (2); *Penthimia guttula* (Pen: He) 30-VI-1996 (1); *Nirvana orientalis* (Nir: He) 30-VI-1996 (1); *Epiacanthus stramineus* (Err: He) 30-VI-1996 (1); *Eurystylus sauteri* (Mir: He) 31-V-1999 (1), 5-X-1996 (1); *Lygocoris* sp. 6 (Mir: He) 4-VII-1999 (1); *Eumicromus confusus* (Hem: Ne) 3-VI-1996 (1); sp. 3 (Sta: Co) 5-X-1996 (1); *Orphinus formosanus?* (Der: Co) 4-VII-1999 (1); *Attalus ryukyuanus* (Mel: Co) 4-VII-1999 (3); *Mordellina tsutsuii* (Mor: Co) 30-VI-1996 (1); *Oedemeronia testaceithorax* (Oed: Co) 3-VI-1996 (1); *Aulacophora femoralis* (Chr: Co) 4-VII-1999 (1); *Pholo octodecimguttata* (Chr: Co) 30-VI-1996 (1); *Xanthonia placida* (Chr: Co) 30-VI-1996 (1), 4-VII-1999 (1); *Monolepta chujoi* (Chr: Co) 4-VII-1999 (1); sp. 3 (Bra: Hy) 30-VI-1996 (1); sp. (Dia: Hy) 4-VII-1999 (1); sp. 20 (Lau: Di) 4-VII-1999 (1); *Siphunculina* sp. (Chl: Di) 31-V-1999 (3); sp. 17 (Tac: Di) 31-V-1999 (1); sp. 2 (Noc: Le) 30-VI-1996 (1)

Glochidion zeylanicum (Eup5)

Matsumuraiella sp. (Cae: Ps) 31-V-1999 (1); *Vekunta malloti* (Der: He) 26-V-1998 (1), 31-V-1999 (7); *Geisha distinctissima* (Fla: He) 30-VI-1996 (1); *Nirvana orientalis* (Nir: He) 30-VI-1996 (1); *Eupoasca polyphemus* (Typ: He) 30-VI-1996 (1); *Cyphon puncticeps hisamatsui* (Hel: Co) 30-VI-1996 (1); sp. 1 (Ela: Co) 31-V-1999 (1); *Orphinus quadrimaculatus* (Der: Co) 30-VI-1996 (1); *Anthicus shibatai* (Ant: Co) 31-V-1999 (2); *Neocrepidodera recticollis* (Chr: Co) 30-VI-1996 (1); *Monolepta chujoi* (Chr: Co) 31-V-1999 (1); *Scolia kuroiwai?* (Sco: Hy) 30-VI-1996 (1); *Lasioglossum amamiensis* (Hal: Hy) 26-V-1998 (1); sp. 2 (Tip: Di) 26-V-1998 (1); sp. 2 (Sci: Di) 30-VI-1996 (1); *Allobaccha nubilipennis* (Syr: Di) 26-V-1998 (1); sp. 4 (Lau: Di) 30-VI-1996 (2); sp. 22 (Lau: Di) 26-V-1998 (1); sp. 24 (Lau: Di) 26-V-1998 (1); sp. 3 (Chl: Di) 30-VI-1996 (1); sp. 12 (Dro: Di) 26-V-1998 (1); sp. (Gra: Le) 30-VI-1996 (1); *Caloptilia* sp. (Gra: Le) 30-VI-1996 (1), 31-V-1999 (2)

Mallotus japonicus (Eup7)

Anisolabis maritima (Psa: De) 3-VI-1996 (1); sp. (Cae: Ps) 3-VI-1996 (1); *Lachesilla* sp. (Lac: Ps) 3-VI-1996 (1); *Euscartopsis zonalis* (Cer: He) 3-VI-1996 (1); *Gargara genistae* (Mem: He) 3-VI-1996 (2); *Lygocoris* sp. 4 (Mir: He) 3-VI-1996 (1); *Lygocoris* sp. 5 (Mir: He) 3-VI-1996 (1); *Oxycetonia forticula forticula* (Sca: Co) 3-VI-1996 (1); *Charitovalgus laetus* (Sca: Co) 3-VI-1996 (1); *Quasimus formosanus* (Ela: Co) 3-VI-1996 (1); *Xenorthrius elongatus* (Cle: Co) 3-VI-1996 (1); *Epuraea commutata* (Nit: Co) 3-VI-1996 (2); *Epuraea dentipes* (Nit: Co) 3-VI-1996 (1); *Harmonia yedoensis* (Coc: Co) 3-VI-1996 (1); *Tolidostena atripennis* (Mor: Co) 3-VI-1996 (1); *Mordellina amamiensis* (Mor: Co) 3-VI-1996 (1); *Oedemeronia sexualis* (Oed: Co) 3-VI-1996 (1); *Cerogia notabilis* (Lag: Co) 3-VI-1996 (1); *Cersium fuscum* (Cer: Co) 3-VI-1996 (1); *Exosoma amamiense* (Chr: Co) 3-VI-1996 (3); *Aphtona formosana* (Chr: Co) 3-VI-1996 (1); sp. 1 (Ich: Hy) 3-VI-1996 (1); sp. 1 (Enc: Hy) 3-VI-1996 (1); *Hylaeus insularum* (Col: Hy) 3-VI-1996 (4); *Lasioglossum nutilum* (Hal: Hy) 3-VI-1996 (4); *Lasioglossum* sp. 1 (Hal: Hy) 3-VI-1996 (2); *Xylocopa amamensis* (Ant: Hy) 3-VI-1996 (3); *Phytomia zonata* (Syr: Di) 3-VI-1996 (2); *Eristalis tenax* (Syr: Di) 3-VI-1996 (2); *Eristalinus arvorum?* (Syr: Di) 3-VI-1996 (4); *Dioxyna sororcula* (Tep: Di) 3-VI-1996 (1); *Anomia* sp. 2 (Tep: Di) 3-VI-1996 (1); sp. 10 (Chl: Di) 3-VI-1996 (1); sp. 16 (Chl: Di) 3-VI-1996 (1); *Siphunculina* sp. (Chl: Di) 3-VI-1996 (1); *Stomorhina obsoleta* (Cal: Di) 3-VI-1996 (53); sp. (Gra: Le) 3-VI-1996 (4)

Securinega suffruticosa var. *amamiense* (Eup8)

sp. (Del: He) 31-V-1999 (1); sp. 3 (Eul: Hy) 31-V-1999 (3); sp. 4 (Lau: Di) 31-V-1999 (2)

Rhamnaceae

Rhamnella franguloides var. *inaequilatera* (Rha1)

Onychostylus pallidiolus (Bla: Bl) 30-VI-1996 (1); *Lygocoris* sp. 2 (Mir: He) 30-VI-1996 (2); *Lebidia octoguttata* (Car: Co) 30-VI-1996 (1); *Quasimus formosanus* (Ela: Co) 30-VI-1996 (2); *Orphinus quadrimaculatus* (Der: Co) 30-VI-1996 (1); *Borboresthes sauteri oshimana* (All: Co) 30-VI-1996 (4); *Polistes rothneyi iwatai* (Ves: Hy) 30-VI-1996 (1); *Hyperalonia tantalus* (Bom: Di) 30-VI-1996 (1); sp. 1 (Lau: Di) 30-VI-1996 (2); sp. 9 (Lau: Di) 30-VI-1996 (1); sp. 10 (Lau: Di) 30-VI-1996 (2); *Stomorhina obsoleta* (Cal: Di) 30-VI-1996 (2); *Chrysomya pinguis* (Cal: Di) 30-VI-1996 (1)

Vitaceae

Ampelopsis brevipedunculata var. *glabrifolia* (Vit1)

(Eum: Hy) 3-VI-1996 (4), 7-VIII-1996 (1); *Euscartopsis zonalis* (Cer: He) 7-VIII-1996 (1); *Eurystylus sauteri* (Mir: He) 7-VIII-1996 (1); *Quasimus formosanus* (Ela: Co) 3-VI-1996 (1); *Cryptogonus horishanus* (Coc: Co) 3-VI-1996 (1); *Scymnus sodalis* (Coc: Co) 7-VIII-1996 (3); *Hemipyxis cinctipennis* (Chr: Co) 3-VI-1996 (1); *Cassida circumdata* (Chr: Co) 3-VI-1996 (1); *Aulacophora* sp. (Chr: Co) 3-VI-1996 (1); *Carinosolia melanosoma fascinata* (Sco: Hy) 7-VIII-1996 (2); *Antherhynchium flavomarginatum* (Eum: Hy) 3-VI-1996 (1); *Okinawepipona kogimai nagasei* (Eum: Hy) 3-VI-1996 (1); *Vespa analis eisa* (Ves: Hy) 3-VI-1996 (3); *Isodontia nigella* (Sph: Hy) 3-VI-1996 (2); *Hylaeus insularum* (Col: Hy) 7-VIII-1996 (6); *Toxorhynchites manicans yamadai* (Cul: Di) 7-VIII-1996 (1); *Asarkina porcina* (Syr: Di) 7-VIII-1996 (2); *Eumerus okinawaensis* (Syr: Di) 7-VIII-1996 (1); *Dioxyna sororcula* (Tep: Di) 7-VIII-1996 (2); sp. 15 (Dro: Di) 7-VIII-1996 (1); sp. 9 (Mus: Di) 7-VIII-1996 (1); *Chrysomya rufifacies* (Cal: Di) 3-VI-1996 (1); sp. 1 (Tac: Di) 3-VI-1996 (1); sp. 13 (Tac: Di) 7-VIII-1996 (1); *Nacaduba kurava septentrionalis* (Lyc: Le) 7-VIII-1996 (1); sp. 1 (Noc: Le) 7-VIII-1996 (1); sp. 3 (Noc: Le) 7-VIII-1996 (1); sp. 4 (Noc: Le) 7-VIII-1996 (1)

Staphyleaceae

Euscaphis japonica (Sta1)

Onychostylus pallidiolus (Bla: Bl) 16-IV-1995 (1); *Oliarus okinawanus* (Cix: He) 16-IV-1995 (2); *Eurystylus sauteri* (Mir: He) 16-IV-1995 (1); *Parapantilius flavomarginatus* (Mir: He) 16-IV-1995 (1); *Scymnus sodalis* (Coc: Co) 16-IV-1995 (1); *Anaspis shibatai* (Scr: Co) 16-IV-1995 (1); *Hemipyxis cinctipennis* (Chr: Co) 16-IV-1995 (1); *Cassida circumdata* (Chr: Co) 16-IV-1995 (1); *Aulacophora* sp. (Chr: Co) 16-IV-1995 (1); *Cyphicerus* sp. (Cur: Co) 16-IV-1995 (1); sp. 4 (Pte: Hy) 16-IV-1995 (1); *Philonicus* sp. (Asi: Di) 16-IV-1995 (1); sp. 4 (Emp: Di) 16-IV-1995 (1); sp. 3 (Dro: Di) 16-IV-1995 (1); sp. 11 (Dro: Di) 16-IV-1995 (1); *Chrysomya pinguis* (Cal: Di) 16-IV-1995 (1); sp. 4 (Tac: Di) 16-IV-1995 (1)

Aceraceae

Acer insulae (Ace1)

Plectoderoides vittifrons (Ach: He) 18-III-1997 (7); *Podabrus* sp. 1 (Can: Co) 18-III-1997 (2); sp. 9 (Dro: Di) 18-III-1997 (1); sp. 13 (Dro: Di) 18-III-1997 (1); sp. 13 (Mus: Di) 18-III-1997 (1)

Rutaceae

Euodia meliifolia (Rut1)

Ornebius kanetataki (Mog: Or) 5-X-1996 (2); *Ornebius kanetataki* (Mog: Or) 5-X-1996 (2); *Oliarus okinawanus* (Cix: He) 5-X-1996 (1); *Geisha distinctissima* (Fla: He) 5-X-1996 (1); *Eurystylus sauteri* (Mir: He) 5-X-1996 (1); *Sastragala esakii* (Pen: He) 5-X-1996 (1); *Oxycetonia forticula forticula* (Sca: Co) 5-X-1996 (6); *Exosoma amamiense* (Chr: Co) 5-X-1996 (3); *Vespa analis eisa* (Ves: Hy) 5-X-1996 (2); *Hylaeus insularum* (Col: Hy) 5-X-1996 (2); *Xylocopa amamensis* (Ant: Hy) 5-X-1996 (5); *Stomorhina obsoleta* (Cal: Di) 5-X-1996 (1)

Araliaceae

Dendropanax trifidus (Arl1)

Eurystylus sauteri (Mir: He) 5-X-1996 (3); *Halticiellus insularis* (Mir: He) 7-VIII-1996 (1); *Liorhyssum hyalinus* (Rho: He) 7-VIII-1996 (1); *Carinosolia melanosoma fascinata* (Sco: Hy) 7-

VIII-1996 (1); *Vespa analis eisa* (Ves: Hy) 7-VIII-1996 (2); *Hylaeus insularum* (Col: Hy) 7-VIII-1996 (1); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (1); *Desmometopa* sp. (Mil: Di) 7-VIII-1996 (1); sp. 6 (Chl: Di) 7-VIII-1996 (1); sp. 8 (Chl: Di) 7-VIII-1996 (1); sp. 11 (Mus: Di) 7-VIII-1996 (1); *Stomorhina obsoleta* (Cal: Di) 7-VIII-1996 (1); *Byasa alcinous loochooana* (Pap: Le) 7-VIII-1996 (1); sp. 2 (Noc: Le) 7-VIII-1996 (1)

Schefflera octophylla (Arl2)

Exosoma amamiense (Chr: Co) 10-XII-1996 (2); sp. 15 (Bra: Hy) 10-XII-1996 (1); sp. 21 (Bra: Hy) 10-XII-1996 (1); sp. 5 (Pte: Hy) 10-XII-1996 (1); *Campsomeris testaceipes* (Sco: Hy) 7-VIII-1996 (2); *Ochetelus itoi* (For: Hy) 10-XII-1996 (3); sp. 2 (Chi: Di) 10-XII-1996 (1); sp. 2 (Sci: Di) 10-XII-1996 (1); sp. 1 (Emp: Di) 10-XII-1996 (1); *Eristalinus quinquestriatum* (Syr: Di) 10-XII-1996 (1); *Allograpta javania* (Syr: Di) 10-XII-1996 (4), 12-XII-1997 (2); *Anomia* sp. 1 (Tep: Di) 10-XII-1996 (2), 12-XII-1997 (2); sp. 4 (Lau: Di) 10-XII-1996 (1); sp. 8 (Lau: Di) 10-XII-1996 (1); sp. 17 (Mus: Di) 10-XII-1996 (1); sp. 20 (Mus: Di) 10-XII-1996 (2); *Stomorhina obsoleta* (Cal: Di) 10-XII-1996 (4), 12-XII-1997 (1), 7-VIII-1996 (1); *Chrysomya pinguis* (Cal: Di) 10-XII-1996 (1); *Chrysomya megacephala* (Cal: Di) 7-VIII-1996 (1); sp. 8 (Tac: Di) 10-XII-1996 (1); sp. 17 (Tac: Di) 12-XII-1997 (1); *Byasa alcinous loochooana* (Pap: Le) 7-VIII-1996 (1)

Apiaceae

Peucedanum japonicum (Api2)

Xestocephalus sp. (Xes: He) 18-III-1997 (2); *Lygocoris* sp. 10 (Mir: He) 18-III-1997 (2), 31-V-1999 (1); *Chrysopa furcifera* (Chr: Ne) 31-V-1999 (1); *Carpelimus siamensis* (Sta: Co) 18-III-1997 (1); *Oxycetonia forticula forticula* (Sca: Co) 18-III-1997 (1), 31-V-1999 (1); *Chiagasinus vittiger rufomarginatus* (Ela: Co) 31-V-1999 (2); *Malthinus okinawanus* (Can: Co) 18-III-1997 (2); *Attalus ryukyuanus* (Mel: Co) 31-V-1999 (1); *Attalus chujoanus* (Mel: Co) 18-III-1997 (1); *Scymnus marinus* (Coc: Co) 31-V-1999 (1); *Mordellina tsutsuii* (Mor: Co) 18-III-1997 (2), 31-V-1999 (2); *Oedemeronia sexualis* (Oed: Co) 31-V-1999 (1); *Anaspis shibatai* (Scr: Co) 18-III-1997 (7); *Anisostira rugipennis* (Lag: Co) 31-V-1999 (2); *Nanohyes plumbeus* (Api: Co) 31-V-1999 (3); *Baris kiboshi* (Cur: Co) 31-V-1999 (2); sp. 1 (For: Hy) 18-III-1997 (1); *Lasioglossum nutilum* (Hal: Hy) 31-V-1999 (11); sp. 15 (Emp: Di) 18-III-1997 (1); sp. 1 (Dol: Di) 31-V-1999 (1); sp. 4 (Pho: Di) 18-III-1997 (1); *Phytomia zonata* (Syr: Di) 31-V-1999 (2); sp. 4 (Lau: Di) 31-V-1999 (1); sp. 13 (Lau: Di) 31-V-1999 (1); sp. 18 (Dro: Di) 31-V-1999 (1); sp. 19 (Dro: Di) 18-III-1997 (1), 31-V-1999 (1); *Stomorhina obsoleta* (Cal: Di) 31-V-1999 (6); *Chrysomya pinguis* (Cal: Di) 31-V-1999 (1); *Chrysomya megacephala* (Cal: Di) 18-III-1997 (1); sp. 17 (Tac: Di) 18-III-1997 (1)

Apocynaceae

Cerbera manghas (Apo1)

Xylocopa amamensis (Ant: Hy) 7-VIII-1996 (3); *Macroglossum corythus* (Sph: Le) 30-VI-1996 (1)

Convolvulaceae

Ipomoea indica (con1)

Tetralonia okinawae okinawae (Ant: Hy) 18-III-1997 (1)

Verbenaceae

Callicarpa japonica var. *luxurians* (Ver1)

Mordellina tsutsuii (Mor: Co) 7-VIII-1996 (3); *Anaspis shibatai* (Scr: Co) 7-VIII-1996 (1); *Pseudiphra obscura* (Cer: Co) 7-VIII-1996 (1); sp. 16 (Ich: Hy) 7-VIII-1996 (1); sp. 5 (Eul: Hy) 7-VIII-1996 (1); *Hylaeus insularum* (Col: Hy) 7-VIII-1996 (3); *Stomorhina obsoleta* (Cal: Di) 7-VIII-1996 (5)

Clerodendrum trichotomum var. *yakusimense* (Ver3)

Lygocoris sp. 1 (Mir: He) 7-VIII-1996 (1); *Attalus ryukyuanus* (Mel: Co) 7-VIII-1996 (2); *Haptoncus concolor?* (Nit: Co) 7-VIII-1996 (1); *Mordellina tsutsuii* (Mor: Co) 7-VIII-1996 (1); *Mordellistena edashigei* (Mor: Co) 7-VIII-1996 (4); *Anaspis shibatai* (Scr: Co) 7-VIII-1996 (1);

sp. 2 (Bra: Hy) 7-VIII-1996 (1); *Hylaeus insularum* (Col: Hy) 5-X-1996 (1), 7-VIII-1996 (1); *Amegilla dulcifera subflavescens* (Ant: Hy) 7-VIII-1996 (1); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (1); *Leptogaster augusta?* (Asi: Di) 7-VIII-1996 (1); sp. 10 (Lau: Di) 7-VIII-1996 (1); sp. 1 (Chl: Di) 7-VIII-1996 (2); sp. 5 (Chl: Di) 7-VIII-1996 (1); sp. 6 (Chl: Di) 7-VIII-1996 (4); sp. 8 (Chl: Di) 7-VIII-1996 (1); sp. 11 (Chl: Di) 7-VIII-1996 (1); sp. 15 (Chl: Di) 7-VIII-1996 (1); sp. 18 (Chl: Di) 7-VIII-1996(2); sp. 7 (Dro: Di) 7-VIII-1996 (1); *Stomorhina obsoleta* (Cal: Di) 7-VIII-1996 (5); *Camptomastix hisbonalis* (Pyr: Le) 5-X-1996 (1); *Macroglossum passalus* (Sph: Le) 7-VIII-1996 (1); *Macroglossum corythus* (Sph: Le) 5-X-1996 (2), 7-VIII-1996 (2)

Premna corymbosa var. *obtusifolia* (Ver4)

Attalus ryukyuanus (Mel: Co) 7-VIII-1996 (1); *Carinosolia melanosoma fascinata* (Sco: Hy) 7-VIII-1996 (3); *Vespa analis eisa* (Ves: Hy) 7-VIII-1996 (1); sp. 16 (Tac: Di) 7-VIII-1996 (1); *Tortyra divitiosa* (Cho: Le) 7-VIII-1996 (2)

Vitex rotundifolia (Ver5)

Dictyophara patruelis (Dic: He) 7-VIII-1996 (2); *Monalocoris filicis* (Mir: He) 7-VIII-1996 (1); *Attalus ryukyuanus* (Mel: Co) 7-VIII-1996 (1); *Scymnus sodalis* (Coc: Co) 7-VIII-1996 (1); sp. 13 (Bra: Hy) 7-VIII-1996 (2); *Lithurge collaris* (Meg: Hy) 7-VIII-1996 (1); *Ceratina satoi* (Ant: Hy) 7-VIII-1996 (3); *Ceratina okinawana* (Ant: Hy) 7-VIII-1996 (1); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (2); *Scedella formosella* (Tep: Di) 7-VIII-1996 (1); *Macroglossum corythus* (Sph: Le) 7-VIII-1996 (1)

Premna microphylla (Ver6)

Lygocoris sp. 5 (Mir: He) 7-V-1997 (1); *Oedemeronia testaceithorax* (Oed: Co) 7-V-1997 (2); *Cerceris yuwanensis* (Sph: Hy) 7-V-1997 (3); *Hylaeus insularum* (Col: Hy) 7-V-1997 (1); *Xylocopa amamensis* (Ant: Hy) 7-V-1997 (3)

Lamiaceae

Mosla dianthera (Lam1)

Episyrphus balteata (Syr: Di) 5-X-1996 (1); *Paraoxyna bidentis* (Tep: Di) 5-X-1996 (7); sp. 16 (Dro: Di) 5-X-1996 (3); *Hymenia recurvalis* (Pyr: Le) 5-X-1996 (1)

Ajuga dictyocarpa (Lam2)

Tetralonia okinawae okinawae (Ant: Hy) 18-III-1997 (2); sp. 1 (Dol: Di) 16-IV-1995 (1); sp. 2 (Pho: Di) 16-IV-1995 (1)

Oleaceae

Ligustrum japonicum (Ole1)

Charitovalgus laetus (Sca: Co) 30-VI-1996 (2); *Mordellina tsutsuii* (Mor: Co) 30-VI-1996 (1); *Borboresthes sauteri oshimana* (All: Co) 30-VI-1996 (2); *Nonartha variabile* (Chr: Co) 30-VI-1996 (4); sp. 2 (Cyn: Hy) 30-VI-1996 (1); *Technomyrmex albipes* (For: Hy) 30-VI-1996 (1); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (1); *Asarkina porcina* (Syr: Di) 30-VI-1996 (1); sp. 1 (Lau: Di) 30-VI-1996 (2); *Stomorhina obsoleta* (Cal: Di) 30-VI-1996 (1)

Orobanchaceae

Aeginetia indica (Oro1)

Episyrphus balteata (Syr: Di) 5-X-1996 (1); *Eumerus okinawaensis* (Syr: Di) 5-X-1996 (1); sp. 7 (Mus: Di) 5-X-1996 (1); *Aethaloessa calidalis* (Pyr: Le) 5-X-1996 (1); *Bocchoris inspersalis* (Pyr: Le) 5-X-1996 (1)

Gesneriaceae

Rhynchotechum discolor (Ges1)

Allobaccha nubilipennis (Syr: Di) 7-VIII-1996 (2)

Goodeniaceae

Scaevola frutescens (Goo1)
Megachile okinawana (Meg: Hy) 7-VIII-1996 (1); *Amegilla dulcifera subflavescens* (Ant: Hy) 7-VIII-1996 (2); *Xylocopa amamensis* (Ant: Hy) 7-VIII-1996 (2); sp. 10 (Mus: Di) 7-VIII-1996 (1); sp. 19 (Mus: Di) 7-VIII-1996 (1); *Stomorhina obsoleta* (Cal: Di) 7-VIII-1996 (2); sp. 12 (Tac: Di) 7-VIII-1996 (1)

Rubiaceae

Lasianthus japonicus (Rub3)
Tetramonium bicarinatum (For: Hy) 12-XII-1997 (1)

Morinda umbellata (Rub4)
Scymnus sodalis (Coc: Co) 30-VI-1996 (1)

Musaenda parviflora (Rub5)
Caecilius oyamai (Cae: Ps) 3-VI-1996 (2); *Vekunta malloti* (Der: He) 3-VI-1996 (1); *Macratria griseosellata* (Ant: Co) 3-VI-1996 (12); *Neocrepidodera recticollis* (Chr: Co) 3-VI-1996 (1); *Acalyptus* sp. ? (Cur: Co) 3-VI-1996 (1); *Xyleborus glabratus* (Sco: Co) 3-VI-1996 (1); *Xylocopa amamensis* (Ant: Hy) 3-VI-1996 (1); sp. 1 (Cec: Di) 3-VI-1996(1); sp. 14 (Chl: Di) 3-VI-1996 (1); *Siphunculina* sp. (Chl: Di) 3-VI-1996 (3); sp. 2 (Dro: Di) 3-VI-1996 (1); *Parnara guttata guttata* (Hes: Le) 3-VI-1996 (1); *Graphium sarpedon nipponum* (Pap: Le) 31-V-1999 (4); *Macroglossum saga* (Sph: Le) 3-VI-1996 (2); *Macroglossum corythus* (Sph: Le) 31-V-1999 (2)

Psychotria homalosperma (Rub7)
Vespa analis eisa (Ves: Hy) 7-VIII-1996 (2); *Vespula shidai amamiana* (Ves: Hy) 4-VII-1999 (1)

Psychotria sepens (Rub8)
Eurystylus sauteri (Mir: He) 30-VI-1996 (1); *Charitovalgus laetus* (Sca: Co) 4-VII-1999 (1); *Protaetia exasperata exasperata* (Sca: Co) 4-VII-1999 (1); *Chiagasinus vittiger rufomarginatus* (Ela: Co) 4-VII-1999 (2); *Mordellina tsutsuii* (Mor: Co) 4-VII-1999 (1); *Epania septentionalis* (Cer: Co) 4-VII-1999 (1); *Lasioglossum subopacum* (Hal: Hy) 30-VI-1996 (2); *Milesia oshimaensis* (Syr: Di) 4-VII-1999 (1)

Wendlandia formosana (Rub12)
Episymploce amamiensis (Bla: Bl) 4-VII-1999 (1); *Rhotana* sp. (Der: He) 30-VI-1996 (1); *Dictyophara patruelis* (Dic: He) 4-VII-1999 (1); *Lygocoris* sp. 1 (Mir: He) 4-VII-1999 (1); *Eurystylus sauteri* (Mir: He) 4-VII-1999 (1); *Lygocoris* sp. 7 (Mir: He) 4-VII-1999 (1); *Bertsa lankana* (Mir: He) 4-VII-1999 (6); *Protaetia lewisi leachi* (Sca: Co) 4-VII-1999 (1); *Scirtes okinawanus* (Hel: Co) 4-VII-1999 (1); *Anthaxia moya* (Bup: Co) 4-VII-1999 (1); sp. 2 (Ela: Co) 4-VII-1999 (1); sp. 3 (Ela: Co) 4-VII-1999 (1); *Mordellina tsutsuii* (Mor: Co) 4-VII-1999 (1); *Mordellistena edashigei* (Mor: Co) 4-VII-1999 (2); *Leptura ochraceofasciata amamiana* (Cer: Co) 4-VII-1999 (1); *Orthaltica shirozui* (Chr: Co) 4-VII-1999 (1); *Hespera lomasa* (Chr: Co) 4-VII-1999 (6); sp. 26 (Bra: Hy) 4-VII-1999 (1); sp. 27 (Bra: Hy) 4-VII-1999 (1); *Technomyrmex albipes* (For: Hy) 4-VII-1999 (1); *Hylaeus insularum* (Col: Hy) 30-VI-1996 (1); *Phytomia zonata* (Syr: Di) 4-VII-1999 (2); *Eumerus okinawaensis* (Syr: Di) 30-VI-1996 (1), 4-VII-1999 (1); sp. 4(Lau: Di) 4-VII-1999 (1); sp. 18 (Lau: Di) 4-VII-1999 (1); sp. 14 (Dro: Di) 4-VII-1999 (1); sp. 16 (Mus: Di) 4-VII-1999 (1); *Stomorhina obsoleta* (Cal: Di) 30-VI-1996 (5), 4-VII-1999 (4); *Nacoleia satsumalis* (Pyr: Le) 4-VII-1999 (1); *Choaspes benjaminii japonica* (Hes: Le) 4-VII-1999 (1)

Asteraceae

Cirsium brevicaule (Ast2)
Attalus chujoanus (Mel: Co) 18-III-1997 (2); *Calliphora lata* (Cal: Di) 12-XII-1997 (1)

Crepidiastrum lanceolatum (Ast4)
Dictyophara patruelis (Dic: He) 10-XII-1996 (1); *Exptochiomera japonica* (Lyg: He) 10-XII-1996

(1); sp. 6 (Sta: Co) 12-XII-1997 (1); *Epilachna vigintioctopunctata* (Coc: Co) 10-XII-1996 (1); sp. 14 (Bra: Hy) 10-XII-1996 (1); sp. 2(Ich: Hy) 10-XII-1996 (1); sp. 4 (Ich: Hy) 10-XII-1996 (1); sp. (Cha: Hy) 10-XII-1996 (1); *Tachysphex japonicus* (Sph: Hy) 10-XII-1996 (1); *Colletes perforator* (Col: Hy) 10-XII-1996 (8), 12-XII-1997 (6); *Lasioglossum* sp. 4 (Hal: Hy) 12-XII-1997 (3); *Apis cerana* (Api: Hy) 12-XII-1997 (4); *Apis mellifera* (Api: Hy) 10-XII-1996 (1); *Ischirosyrphus* sp. (Syr: Di) 10-XII-1996 (1); *Episyrphus balteata* (Syr: Di) 10-XII-1996 (2); *Chrysotoxum testaceum* (Syr: Di) 10-XII-1996 (2), 12-XII-1997 (1); *Asarkina ericetorum* (Syr: Di) 12-XII-1997 (1); *Cheilosia* sp. ? (Syr: Di) 12-XII-1997 (1); *Dioxyna sororcula* (Tep: Di) 10-XII-1996 (1); sp. 5 (Mus: Di) 10-XII-1996 (1); sp. 6 (Tac: Di) 12-XII-1997 (2); *Catopsilia pomona* (Pie: Le) 12-XII-1997 (1)

Farfugium japonicum (Ast6)
Tropidothorax belogolowi (Lyg: He) 10-XII-1996 (4); *Colletes perforator* (Col: Hy) 10-XII-1996 (2); *Episyrphus balteata* (Syr: Di) 10-XII-1996 (1); sp. 2 (Mus: Di) 10-XII-1996 (1)

Ageratum houstonianum (Ast7)
Lasioglossum subopacum (Hal: Hy) 5-X-1996 (2); sp. 9 (Tac: Di) 5-X-1996 (1)

Wedelia biflora (Ast8)
Megachile okinawana (Meg: Hy) 30-VI-1996 (1); *Tetralonia okinawae okinawae* (Ant: Hy) 18-III-1997 (1)

Youngia japonica (Ast9)
Lygocoris sp. 9 (Mir: He) 18-III-1997 (1); *Exptochiomera japonica* (Lyg: He) 18-III-1997 (1); *Olibrus consanguineus* (Pha: Co) 18-III-1997 (3); sp. 24 (Bra: Hy) 18-III-1997 (1); sp. 1 (For: Hy) 18-III-1997 (4); *Lasioglossum* sp. 2 (Hal: Hy) 18-III-1997 (1); *Andrena knuthi* (And: Hy) 18-III-1997 (6); *Eupeodes corollae* (Syr: Di) 18-III-1997 (3); *Paraoxyna bidentis* (Tep: Di) 18-III-1997 (1); *Ensina sonchi* (Tep: Di) 18-III-1997 (1); *Sphenella sinensis* (Tep: Di) 18-III-1997 (1); sp. 12 (Mus: Di) 18-III-1997 (1); *Stomorhina obsoleta* (Cal: Di) 18-III-1997 (15)

Bidens pilosa var. *radiata* (Ast10)
Bombylius major (Bom: Di) 18-III-1997 (1)

Aster asa-grayi (Ast11)
Mordellina tsutsuii (Mor: Co) 18-III-1997 (2); *Aulacophora femoralis* (Chr: Co) 18-III-1997 (2); sp. 6 (Sci: Di) 18-III-1997 (1)

Pandanaceae

Pandanus odoratissimus (Pan1)
sp. 1 (Thr: Th) 7-VIII-1996 (3); *Quasimus* sp. (Ela: Co) 7-VIII-1996 (1); *Haptoncus luteolus?* (Nit: Co) 7-VIII-1996 (1); *Haptoncurina motschulskii* (Nit: Co) 7-VIII-1996 (4); *Haptoncus concolor?* (Nit: Co) 7-VIII-1996 (1); *Carpophilus tenuis* (Nit: Co) 7-VIII-1996 (1)

Araceae

Alocasia odora (Ara1)
Carpelius exigus? (Sta: Co) 30-VI-1996 (14); *Pseudoloterus syzeton?* (Ade: Co) 30-VI-1996 (1); *Lasioglossum subopacum* (Hal: Hy) 30-VI-1996 (1); *Colocasiomyia alocasiae* (Dro: Di) 30-VI-1996 (8); *Colocasiomyia xenalocasiae* (Dro: Di) 30-VI-1996 (1)

Commelinaceae

Pollia japonica var. *minor* (Com1)
Protaetia pryeri oschimana (Sca: Co) 30-VI-1996 (1); *Chlorophorus quinquefasciatus* (Cer: Co) 30-VI-1996 (1); *Lasioglossum subopacum* (Hal: Hy) 30-VI-1996 (1)

Cyperaceae

Scleria terrestris (Cyp1)
Oedemeronia testaceithorax (Oed: Co) 18-III-1997 (2)

Musaceae

Musa balbisiana (Mus1)
Vespa analis eisa (Ves: Hy) 7-VIII-1996 (1)

Zingiberaceae

Alpinia formosana (Zin1)
Amegilla dulcifera subflavescens (Ant: Hy) 30-VI-1996 (1); *Xylocopa amamensis* (Ant: Hy) 30-VI-1996 (1)

Alpinia intermedia (Zin2)
Amegilla dulcifera subflavescens (Ant: Hy) 30-VI-1996 (3)

Alpinia speciosa (Zin3)
Amegilla dulcifera subflavescens (Ant: Hy) 30-VI-1996 (2); sp. 5 (Dro: Di) 30-VI-1996 (3); sp. 8 (Dro: Di) 30-VI-1996 (1)

Iridaceae

Belamcanda chinensis (Iri1)
Papilio bianor amamiensis (Pap: Le) 16-IV-1995 (1)

Stemonaceae

Croomia japonica (Stm1)
sp. 3 (Tip: Di) 31-V-1999 (1); sp. 3 (Cul: Di) 31-V-1999 (1); sp. 2 (Myc: Di) 31-V-1999 (1); sp. 12 (Dro: Di) 31-V-1999 (1); sp. 7 (Mus: Di) 31-V-1999 (1)

Appendix 2.

A List of Floral Host Species for Each Anthophilous Insect Species Recorded on Amami-Oshima Islands in 1996-1999

Flower-visit records of each insect species are arranged in the following sequence: plant species, (plant species code), date and (number of individuals collected or observed). Insect taxa and plant taxa are arranged following the natural systems of Hirashima (1989) and Cronquist (1981), respectively.

BLATTARIA

Blattellidae

Onychostylus pallidiolus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

Episymploce amamiensis
Wendlandia formosana (Rub12) 4-VII-1999 (1)

ORTHOPTERA

Mogoplistidae

Ornebius kanetataki
Euodia meliifolia (Rut1) 5-X-1996 (2)

Ornebius kanetataki
Euodia meliifolia (Rut1) 5-X-1996 (2)

DERMAPTERA

Psalididae

Anisolabis maritima
Glochidion acuminatum (Eup3) 3-VI-1996 (1)

Anisolabis maritima
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Schima wallichii* (The1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

PSOCOPTERA

Caeciliidae

sp.
Machilus thunbergii (Lau4) 18-III-1997 (3); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Caecilius oyamai
Machilus thunbergii (Lau4) 18-III-1997 (4); *Symplocos microcalyx* (Sym3) 16-IV-1995 (1), 18-III-1997 (1); *Maesa tenera* (Myr4) 18-III-1997 (2); Glochidion acuminatum (Eup3) 31-V-1999 (1); Musaenda parviflora (Rub5) 3-VI-1996 (2)

Matsumuraiella sp.
Glochidion zeylanicum (Eup5) 31-V-1999 (1)

Stenopsocidae

Stenopsocus sp.
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp.
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp.
Glochidion acuminatum (Eup3) 3-VI-1996 (1)

Lachesillidae

Lachesilla sp.
Glochidion acuminatum (Eup3) 3-VI-1996 (2); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Psocidae

Psococerastis sp. 1
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Psococerastis sp. 2
Glochidion obovatum (Eup4) 31-V-1999 (1)

Psococerastis sp. 3
Glochidion obovatum (Eup4) 31-V-1999 (1)

THYSANOPTERA

Phlaeothripidae

Leeuwenia pasanii
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Leeuwenia sp.
Machilus thunbergii (Lau4) 18-III-1997 (1)

Thripidae

sp. 1
Pandanus odoratissimus (Pan1) 7-VIII-1996 (3)

sp. 2
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (3)

HEMIPTERA

Cixiidae

Betacixius sp.
Glochidion acuminatum (Eup3) 31-V-1999 (1)

Betacixius sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Oliarus okinawanus
Hibiscus makinoi (Mal2) 5-X-1996 (2); *Glochidion acuminatum* (Eup3) 31-V-1999 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (2); *Euodia meliifolia* (Rut1) 5-X-1996 (1)

Delphacidae

sp.
Heritiera littoralis (Stel) 3-VI-1996 (1)

Derbidae

Vekunta malloti
Glochidion zeylanicum (Eup5) 26-V-1998 (1), 31-V-1999 (7); *Musaenda parviflora* (Rub5) 3-VI-1996 (1)

Rhotana sp.
Wendlandia formosana (Rub12) 30-VI-1996 (1)

Achilidae

Plectoderoides vittifrons
Stauntonia hexaphylla (Lar1) 18-III-1997 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (4); *Acer insulae* (Ace1) 18-III-1997 (7)

Deferunda rubrostigma
Ardisia sieboldii (Myr3) 30-VI-1996 (1); *Glochidion acuminatum* (Eup3) 3-VI-1996 (1)

Dictyopharidae

Dictyophara patruelis
Vitex rotundifolia (Ver5) 7-VIII-1996 (2); *Wendlandia formosana* (Rub12) 4-VII-1999 (1); *Crepidiastrum lanceolatum* (Ast4) 10-XII-1996 (1)

Tropiduchidae

Mesepora onukii
Lagerstroemia subcostata (Lyt1) 7-VIII-1996 (3); *Kandelia candel* (Rhi1) 7-VIII-1996 (4)

Flatidae

Geisha distinctissima
Glochidion obovatum (Eup4) 4-VII-1999 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1); *Euodia meliifolia* (Rut1) 5-X-1996 (1)

Ricaniidae

Ricania japonica
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1)

Euricania ocellus
Lagerstroemia subcostata (Lyt1) 7-VIII-1996 (7)

Cercopidae

Euscartopsis zonalis
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Glochidion obovatum* (Eup4) 3-VI-1996 (2); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

Membracidae

Gargara genistae
Glochidion obovatum (Eup4) 3-VI-1996 (2); *Mallotus japonicus* (Eup7) 3-VI-1996 (2)

Ledridae

Tituria angulata
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

Idioceridae

Idiocerus sp.
Heritiera littoralis (Stel) 31-V-1999 (2)

Iassidae

Stragamia mundus
Trema orientalis (Ulm1) 31-V-1999 (1)

Penthimiidae

Penthimia guttula
Glochidion obovatum (Eup4) 30-VI-1996 (1)

Xestocephalidae

Xestocephalus sp.
Peucedanum japonicum (Api1) 18-III-1997 (2)

Nirvanidae

Nirvana orientalis
Heritiera littoralis (Stel) 3-VI-1996 (1); *Glochidion obovatum* (Eup4) 30-VI-1996 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1)

Errhomenellidae

Epiacanthus stramineus
Glochidion obovatum (Eup4) 30-VI-1996 (1)

Typhlocybidae

Eupoasca polyphemus
Glochidion zeylanicum (Eup5) 30-VI-1996 (1)

sp.
Trema orientalis (Ulm1) 31-V-1999 (1)

Deltocephalidae

Matsumurella kogotensis
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (3)

sp.
Securinega suffruticosa var. *amamiense* (Eup8) 31-V-1999 (1)

Psyllidae

Nesiope ornata
Heritiera littoralis (Stel) 3-VI-1996 (12), 31-V-1999 (16)

Trioza nigra
Stauntonia hexaphylla (Lar1) 18-III-1997 (1); *Styrax japonica* (Sty1) 17-II-1999 (1)

Aphididae

Eutrichosiphum pasaniae
Glochidion acuminatum (Eup3) 7-V-1997 (1)

Miridae

Lygocoris sp. 1
Meliosma rigida (Sab1) 30-VI-1996 (9); *Trema orientalis* (Ulm1) 31-V-1999 (4); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (2); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (7); *Heritiera littoralis* (Stel) 31-V-1999 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (2); *Ardisia sieboldii* (Myr3) 31-V-1999 (5);

Lagerstroemia subcostata (Lyt1) 4-VII-1999 (7), 7-VIII-1996 (3); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Eurystylus sauteri
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 31-V-1999 (1); *Lagerstroemia subcostata* (Lyt1) 7-VIII-1996 (2); *Glochidion acuminatum* (Eup3) 3-VI-1996 (1); *Glochidion obovatum* (Eup4) 31-V-1999 (1), 5-X-1996 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1); *Euodia meliifolia* (Rut1) 5-X-1996 (1); *Dendropanax trifidus* (Ari1) 5-X-1996 (3); *Psychotria sepens* (Rub8) 30-VI-1996 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Lygocoris sp. 2
Rhamnella franguloides var. *inaequilatera* (Rha1) 30-VI-1996 (2)

Lygocoris sp. 3
Lagerstroemia subcostata (Lyt1) 7-VIII-1996 (1)

Monalocoris filicis
Vitex rotundifolia (Ver5) 7-VIII-1996 (1)

Halticiellus insularis
Dendropanax trifidus (Ari1) 7-VIII-1996 (1)

Lygocoris sp. 4
Mallotus japonicus (Eup7) 3-VI-1996 (1)

Parapantilius flavomarginatus
Euscaphis japonica (Sta1) 16-IV-1995 (1)

Lygocoris sp. 5
Trema orientalis (Ulm1) 31-V-1999 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 18-III-1997 (1); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Premna microphylla* (Ver6) 7-V-1997 (1)

Lygocoris sp. 6
Glochidion obovatum (Eup4) 4-VII-1999 (1)

Lygocoris sp. 7
Wendlandia formosana (Rub12) 4-VII-1999 (1)

Lygocoris sp. 8
Trema orientalis (Ulm1) 31-V-1999 (2)

Lygocoris sp. 9
Youngia japonica (Ast9) 18-III-1997 (1)

Tinginotum perlatum
Stauntonia hexaphylla (Lar1) 18-III-1997 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

Adelphocoris demissus
Stauntonia hexaphylla (Lar1) 18-III-1997 (1); *Styrax japonica* (Sty1) 18-III-1997 (1)

Bertsa lankana
Wendlandia formosana (Rub12) 4-VII-1999 (6)

Lygocoris sp. 10
Peucedanum japonicum (Api1) 18-III-1997 (2), 31-V-1999 (1)

Campylomma lividicornis
Heritiera littoralis (Ste1) 31-V-1999 (5); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

Anthocoridae

Bilia japonica
Trema orientalis (Ulm1) 31-V-1999 (1)

Anthocoris miyamotoi
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Lygaeidae

Tropidothorax belogolowi
Farfugium japonicum (Ast6) 10-XII-1996 (4)

Neolethaeus dallasi
Meliosma rigida (Sab1) 30-VI-1996 (7); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1)

Exptochiomera japonica
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1); *Youngia japonica* (Ast9) 18-III-1997 (1)

Rhopalidae

Liorhyssum hyalinus
Ranunculus sieboldii (Ran3) 5-X-1996 (1); *Dendropanax trifidus* (Arl1) 7-VIII-1996 (1)

Pyrrhocoridae

Dysderus philippinus
Hibiscus hamabo (Mal1) 30-VI-1996 (1)

Pentatomidae

Andrallus spindeus
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

Graphosoma rubrolineatum
Canavalia lineata (Leg3) 7-VIII-1996 (1)

Sastragala esakii
Euodia meliifolia (Rut1) 5-X-1996 (1)

Elasmostethus humeralis
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

Glaucias subpunctatus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Eocanthecoma kyushuensis
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Chrysopidae

Chrysopa sp. 1
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1)

Chrysopa furcifera
Peucedanum japonicum (Api1) 31-V-1999 (1)

Chrysopa sp. 2
Heritiera littoralis (Ste1) 31-V-1999 (1)

Hemerobiidae

Eumicromus confusus
Glochidion obovatum (Eup4) 3-VI-1996 (1)

Sialidae

Nipponosialis amamiensis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

COLEOPTERA

Carabidae

Colpodes ishidai
Schima wallichii (The1) 3-VI-1996 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

Stenolophus fulnicornis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Lebidia octoguttata
Rhamnella franguloides var. *inaequilatera* (Rha1) 30-VI-1996 (1)

Lebia purkynei
Schima wallichii (The1) 3-VI-1996 (1)

Staphilinidae

Carpelius exigus?
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1); *Diospyrus japonica* (Ebe1) 3-VI-1996 (1); *Symplocos microcalyx* (Sym3) 16-IV-1995 (10); *Lagerstroemia subcostata* (Lyt1) 7-VIII-1996 (1); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Alocasia odora* (Ara1) 30-VI-1996 (14)

Sepedophilus sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 3
Glochidion obovatum (Eup4) 5-X-1996 (1)

sp. 4
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Carpelimus siamensis
Styrax japonica (Sty1) 17-II-1999 (1); *Peucedanum japonicum* (Api1) 18-III-1997 (1)

sp. 6
Crepidiastrum lanceolatum (Ast4) 12-XII-1997 (1)

Eusphalerum lewisi?
Eurya japonica (The2) 17-II-1999 (1)

Scarabaeidae

Protaetia pryeri oschimana
Pollia japonica var. *minor* (Com1) 30-VI-1996 (1)

Popillia insularis
Ardisia quinquegona (Myr2) 30-VI-1996 (2)

Oxycetonia forticula forticula
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (4), 18-III-1997 (1); *Schima wallichii* (The1) 3-VI-1996 (1), 31-V-1999 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Euodia meliifolia* (Rut1) 5-X-1996 (6); *Peucedanum japonicum* (Api1) 18-III-1997 (1), 31-V-1999 (1)

Ectinohoplia gracilis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Schima wallichii* (The1) 31-V-1999 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

Charitovalgus laetus
Mallotus japonicus (Eup7) 3-VI-1996 (1); *Ligustrum japonicum* (Ole1) 30-VI-1996 (2); *Psychotria sepens* (Rub8) 4-VII-1999(1)

Protaetia exasperata exasperata
Psychotria sepens (Rub8) 4-VII-1999 (1)

Protaetia lewisi leachi
Wendlandia formosana (Rub12) 4-VII-1999 (1)

Helodidae

Cyphon sp.
Lagerstroemia subcostata (Lyt1) 7-VIII-1996 (1)

Cyphon sinuosus
Heritiera littoralis (Ste1) 3-VI-1996 (1)

Cyphon puncticeps hisamatsui
Glochidion zeylanicum (Eup5) 30-VI-1996 (1)

Scirtes okinawanus
Wendlandia formosana (Rub12) 4-VII-1999 (1)

Buprestidae

Chrysodema lewisii
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Vigna marina* (Leg5) 7-VIII-1996 (1)

Anthaxia moya
Meliosma rigida (Sab1) 30-VI-1996 (5); *Schima wallichii* (The1) 3-VI-1996 (1); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Habroloma nixillum insulicola
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (2), 7-VIII-1996 (1)

Endelus opacipennis
Maesa tenera (Myr4) 18-III-1997 (1)

Habroloma liukiuense
Symplocos microcalyx (Sym3) 18-III-1997 (1)

Elateridae

Penthelater plebejus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2)

Hayekpenthes pallidus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Ampedus amamiensis
Machilus thunbergii (Lau4) 18-III-1997 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (4); *Symplocos microcalyx* (Sym3) 18-III-1997 (10); *Maesa tenera* (Myr4) 18-III-1997 (1)

Ampedus aritai
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Chatanys insularis istoi
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Chiagasinus vittiger rufomarginatus
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Peucedanum japonicum* (Api1) 31-V-1999 (2); *Psychotria sepens* (Rub8) 4-VII-1999 (2)

sp. 1
Ardisia quinquegona (Myr2) 30-VI-1996 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1); *Glochidion zeylanicum* (Eup5) 31-V-1999 (1)

Quasimus formosanus
Mallotus japonicus (Eup7) 3-VI-1996 (1); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996 (2); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 3-VI-1996 (1)

Quasimus sp.
Pandanus odoratissimus (Pan1) 7-VIII-1996 (1)

sp. 2
Wendlandia formosana (Rub12) 4-VII-1999 (1)

sp. 3
Wendlandia formosana (Rub12) 4-VII-1999 (1)

Cantharidae

Prothemus ryukyuanus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Symplocos microcalyx* (Sym3) 16-IV-1995 (1)

Themus kazuoi
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (5); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

Athemus sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

Podabrus ihai
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

Podabrus sp. 1
Machilus thunbergii (Lau4) 18-III-1997 (1); *Stauntonia hexaphylla* (Lar1) 18-III-1997 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 18-III-1997 (2); *Acer insulae* (Ace1) 18-III-1997 (2)

Podabrus sp. 2
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (9); *Symplocos microcalyx* (Sym3) 16-IV-1995 (2)

Podabrus sp. 3
Machilus thunbergii (Lau4) 18-III-1997 (2); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (9), 18-III-1997 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

Kandyosilis mucronata
Deutzia naseana (Hyd1) 16-IV-1995 (1)

Malthinus okinawanus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (5), 18-III-1997 (2); *Peucedanum japonicum* (Api1) 18-III-1997 (2)

Malthinellus chujoi
Elaeocarpus japonicus (Ela1) 16-IV-1995 (2)

Dermestidae

Orphinus quadrimaculatus
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996 (1)

Orphinus formosanus?
Glochidion obovatum (Eup4) 4-VII-1999 (1)

Trogoderma sp.
Schima wallichii (The1) 31-V-1999 (1)

Cleridae

Xenorthrius elongatus
Mallotus japonicus (Eup7) 3-VI-1996 (1)

Stenocallinerus prasinatus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Callimerus ryukyuensis
Trema orientalis (Ulm1) 31-V-1999 (1)

Melyridae

Attalus ryukyuanus
Meliosma rigida (Sab1) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 30-VI-1996 (3); *Glochidion obovatum* (Eup4) 4-VII-1999 (3); *Peucedanum japonicum* (Api1) 31-V-1999 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (2); *Premna corymbosa* var. *obtusifolia* (Ver4) 7-VIII-1996 (1); *Vitex rotundifolia* (Ver5) 7-VIII-1996 (1)

Attalus chujoanus
Lysimachia mauritiana (Pri1) 18-III-1997 (3); *Pittosporum tobira* (Pit1) 18-III-1997 (24);

Peucedanum japonicum (Api1) 18-III-1997 (1); *Cirsium brevicaule* (Ast2) 18-III-1997 (2)

Nitidulidae

Epuraea commutata
Schima wallichii (The1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (2)

Meligethes shirakii
Clematis terniflora (Ran2) 3-VI-1996 (1); *Schima wallichii* (The1) 3-VI-1996 (2)

Epuraea dentipes
Diospyrus japonica (Ebe1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Haptoncus luteolus?
Pandanus odoratissimus (Pan1) 7-VIII-1996 (1)

Haptoncurina motschulskii
Ilex integra (Aqu1) 3-VI-1996 (1); *Pandanus odoratissimus* (Pan1) 7-VIII-1996 (4)

Haptoncus concolor?
Melothria liukiuensis (Cuc1) 10-XII-1996 (1); *Ardisia sieboldii* (Myr3) 31-V-1999 (2); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1); *Pandanus odoratissimus* (Pan1) 7-VIII-1996 (1)

Carpophilus tenuis
Pandanus odoratissimus (Pan1) 7-VIII-1996 (1)

Phalacridae

Olibrus consanguineus
Youngia japonica (Ast9) 18-III-1997 (3)

Silvaniidae

Psamoecus triguttatus
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1)

sp.
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1)

Cryptophagidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 2
Ardisia sieboldii (Myr3) 31-V-1999 (1)

Coccinellidae

Harmonia yedoensis
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Schima wallichii* (The1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Cryptogonus orbiculus
Ardisia sieboldii (Myr3) 30-VI-1996 (1)

Cryptogonus horishanus
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Schima wallichii* (The1) 4-VII-1999 (1); *Pittosporum tobira* (Pit1) 18-III-1997 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 3-VI-1996 (1)

Epilachna vigintioctopunctata
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

Scymnus sodalis
Cinnamomum doederleinii (Laul) 3-VI-1996 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fagl) 16-IV-1995 (3); *Lagerstroemia subcostata* (Lytl) 7-VIII-1996 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vitl) 7-VIII-1996 (3); *Euscaphis japonica* (Stal) 16-IV-1995 (1); *Vitex rotundifolia* (Ver5) 7-VIII-1996 (1); *Morinda umbellata* (Rub4) 30-VI-1996 (1)

Scymnus marinus
Peucedanum japonicum (Apil) 31-V-1999 (1)

Scymnus miyatakei
Glochidion acuminatum (Eup3) 7-V-1997 (1)

Lemnia biplagiata
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1)

Menochilus sexmaculatus
Schima wallichii (Thel) 31-V-1999 (1)

Mordellidae

Mordellina tsutsuii
Cinnamomum doederleinii (Laul) 3-VI-1996 (1); *Meliosma rigida* (Sabl) 30-VI-1996 (3); *Castanopsis sieboldii* subsp. *leutchuensis* (Fagl) 16-IV-1995 (1); *Schima wallichii* (Thel) 4-VII-1999 (3); *Ardisia quinquegona* (Myr2) 30-VI-1996 (11); *Lagerstroemia subcostata* (Lytl) 7-VIII-1996 (1); *Glochidion obovatum* (Eup4) 30-VI-1996 (1); *Peucedanum japonicum* (Apil) 18-III-1997 (2), 31-V-1999 (2); *Callicarpa japonica* var. *luxurians* (Verl) 7-VIII-1996 (3); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1); *Ligustrum japonicum* (Olel) 30-VI-1996 (1); *Psychotria sepens* (Rub8) 4-VII-1999 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1); *Aster asa-grayi* (Astl1) 18-III-1997 (2)

Tolidostena atripennis
Mallotus japonicus (Eup7) 3-VI-1996 (1)

Mordellina amamiensis
Meliosma rigida (Sabl) 30-VI-1996 (3); *Schima wallichii* (Thel) 3-VI-1996 (6); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Mordellina brunneotincta
Clematis terniflora (Ran2) 3-VI-1996 (2); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

Mordellistena edashigei
Meliosma rigida (Sabl) 30-VI-1996 (15); *Reynoutria japonica* (Pol2) 5-X-1996 (2); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (4); *Wendlandia formosana* (Rub12) 4-VII-1999 (2)

Mordellina polleola
Ardisia sieboldii (Myr3) 31-V-1999 (11)

Tolidopalpus galloisi
Schima wallichii (Thel) 4-VII-1999 (2)

Oedemeridae

Oedemeronia testaceithorax

Cinnamomum doederleinii (Laul) 3-VI-1996 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fagl) 16-IV-1995 (5); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (2); *Pittosporum tobira* (Pitl) 18-III-1997 (1); *Ilex integra* (Aqul) 3-VI-1996 (2); *Glochidion obovatum* (Eup4) 3-VI-1996 (1); *Premna microphylla* (Ver6) 7-V-1997 (2); *Scleria terrestris* (Cypl) 18-III-1997 (2)

Oedemeronia sexualis

Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1); *Pittosporum tobira* (Pitl) 18-III-1997 (6); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Peucedanum japonicum* (Apil) 31-V-1999 (1)

Eobia cinereipennis

Ardisia sieboldii (Myr3) 31-V-1999 (1)

Anthicidae

Anthicus shibatai

Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1); *Symplocos microcalyx* (Sym3) 16-IV-1995 (6); *Glochidion zeylanicum* (Eup5) 31-V-1999 (2)

Macratria griseosellata

Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Lagerstroemia subcostata* (Lytl) 7-VIII-1996 (1); *Musaenda parviflora* (Rub5) 3-VI-1996 (12)

Aderidae

Pseudoloterus syzeton?

Alocasia odora (Aral) 30-VI-1996 (1)

Scraptiidae

Anaspis shibatai

Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (6), 18-III-1997 (9); *Maesa tenera* (Myr4) 18-III-1997 (4); *Euscaphis japonica* (Stal) 16-IV-1995 (1); *Peucedanum japonicum* (Apil) 18-III-1997 (7); *Callicarpa japonica* var. *luxurians* (Verl) 7-VIII-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1)

Lagriidae

Arthromacra amamiana

Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (4)

Cerogia notabilis

Mallotus japonicus (Eup7) 3-VI-1996 (1)

Anisostira rugipennis

Peucedanum japonicum (Apil) 31-V-1999 (2)

Langridae

Anadastus melanosternus

Heritiera littoralis (Stel) 3-VI-1996 (1)

Alleculidae

Borboresthes sauteri oshimana

Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Ardisia sieboldii* (Myr3) 31-V-1999 (1); *Rhamnella franguloides* var. *inaequilatera* (Rhal) 30-VI-1996 (4); *Ligustrum japonicum* (Olel) 30-VI-1996 (2)

Allecula shibatai
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (11); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (4); *Symplocos microcalyx* (Sym3) 16-IV-1995 (3); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

Allecula tenuis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Pittosporum tobira* (Pit1) 18-III-1997 (1)

Cerambycidae

Formosopyrrhona satoi
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1), 18-III-1997 (1)

Leptura ochraceofasciata amamiana
Ardisia quinquegona (Myr2) 30-VI-1996 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Chlorophorus quinquefasciatus
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (2); *Pollia japonica* var. *minor* (Com1) 30-VI-1996 (1)

Glenea chlorospila
Heritiera littoralis (Ste1) 3-VI-1996 (1)

Stenodryas clavigera
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (3)

Cersium fuscum
Glochidion acuminatum (Eup3) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

Pseudiphra obscura
Ardisia quinquegona (Myr2) 30-VI-1996 (1); *Callicarpa japonica* var. *luxurians* (Ver1) 7-VIII-1996 (1)

Chloridolum leochooanum
Schima wallichii (The1) 4-VII-1999 (1)

Epania septentionalis
Psychotria sepens (Rub8) 4-VII-1999 (1)

Euseboides matsudai
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Chrysomelidae

Exosoma amamiense
Litsea japonica (Lau2) 5-X-1996 (1); *Clematis terniflora* (Ran2) 3-VI-1996 (2); *Reynoutria japonica* (Pol2) 5-X-1996 (5); *Schima wallichii* (The1) 3-VI-1996 (2); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Glochidion acuminatum* (Eup3) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (3); *Euodia meliifolia* (Rut1) 5-X-1996 (3); *Schefflera octophylla* (Ari2) 10-XII-1996 (2)

Aulacophora nigripennis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Smoragdina quadratoma culata
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Hemipyxis cinctipennis
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 3-VI-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

Aulacophora femoralis
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Glochidion obovatum* (Eup4) 4-VII-1999 (1); *Aster asa-grayi* (Ast11) 18-III-1997 (2)

Aphtona formosana
Mallotus japonicus (Eup7) 3-VI-1996 (1)

Oomorphoides loochooensis
Deutzia naseana (Hyd1) 16-IV-1995 (1)

Oomorphoides sp.
Lagerstroemia subcostata (Lyt1) 7-VIII-1996 (1)

Nonartha variabile
Ligustrum japonicum (Ole1) 30-VI-1996 (4)

Nodena sp.
Pittosporum tobira (Pit1) 18-III-1997 (1)

Nodina chalcosoma
Ardisia quinquegona (Myr2) 30-VI-1996 (2)

Demotina major
Schima wallichii (The1) 3-VI-1996 (1)

Aphothona foudrasi
Glochidion acuminatum (Eup3) 31-V-1999 (2)

Pholo octodecimguttata
Glochidion obovatum (Eup4) 30-VI-1996 (1)

Cassida circumdata
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 3-VI-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

Cryptocephalus perelegans
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 30-VI-1996 (1); *Glochidion acuminatum* (Eup3) 3-VI-1996 (1)

Aphothona amamiana
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1)

Neocrepidodera recticollis
Glochidion acuminatum (Eup3) 3-VI-1996 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1); *Musaenda parviflora* (Rub5) 3-VI-1996 (1)

Chlamisus japonicus
Meliosma rigida (Sab1) 30-VI-1996 (1)

Orthaltica shirozui
Clematis terniflora (Ran2) 3-VI-1996 (3); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Xanthonia placida
Ardisia quinquegona (Myr2) 30-VI-1996 (2); *Ardisia sieboldii* (Myr3) 30-VI-1996 (7); *Glochidion obovatum* (Eup4) 30-VI-1996 (1), 4-VII-1999 (1)

Aulacophora sp.
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 3-VI-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

Hespera lomasa
Wendlandia formosana (Rub12) 4-VII-1999 (6)

Monolepta chujoi
Machilus thunbergii (Lau4) 18-III-1997 (1); *Maesa tenera* (Myr4) 18-III-1997 (2); *Glochidion acuminatum* (Eup3) 31-V-1999(13); *Glochidion obovatum* (Eup4) 4-VII-1999 (1); *Glochidion zeylanicum* (Eup5) 31-V-1999 (1)

Anthribidae

Choragus sp.
Schima wallichii (The1) 3-VI-1996 (1)

Apionidae

Nanohyes plumbeus
Peucedanum japonicum (Api1) 31-V-1999 (3)

Curculionidae

Macrocorynus sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Bredia hirsuta* (Mel2) 5-X-1996 (1)

Cyphicerus sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (3); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

Cyphicerus sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Acalyptus sp. ?
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Schima wallichii* (The1) 3-VI-1996 (1); *Musaenda parviflora* (Rub5) 3-VI-1996 (1)

Anthonomus sp.
Schima wallichii (The1) 3-VI-1996 (1)

Tychius sp.
Deutzia naseana (Hyd1) 16-IV-1995 (2)

Baris kiboshi
Peucedanum japonicum (Api1) 31-V-1999 (2)

Cossonus sp.
Styrax japonica (Sty1) 17-II-1999 (1)

Scolytidae

Xyleborus glabratus
Musaenda parviflora (Rub5) 3-VI-1996 (1)

HYMENOPTERA

Tenthredinidae

Athalia japonica
Persicaria chinensis (Pol1) 10-XII-1996 (2)

Braconidae

sp. 1
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 2
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 3
Glochidion obovatum (Eup4) 30-VI-1996 (1)

sp. 4
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 5
Ilex integra (Aqu1) 3-VI-1996 (1)

sp. 6
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1)

sp. 7
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 8
Ardisia sieboldii (Myr3) 30-VI-1996 (3)

sp. 9
Ardisia sieboldii (Myr3) 30-VI-1996 (1)

sp. 10
Hibiscus makinoi (Mal2) 5-X-1996 (1)

sp. 11
Trema orientalis (Ulm1) 31-V-1999 (1)

sp. 12
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 13
Vitex rotundifolia (Ver5) 7-VIII-1996 (2)

sp. 14
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

sp. 15
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (2); *Glochidion acuminatum* (Eup3) 3-VI-1996 (1); *Schefflera octophylla* (Arl2) 10-XII-1996 (1)

sp. 16
Meliosma oldhamii (Sab1) 30-VI-1996 (1)

sp. 17
Meliosma rigida (Sabl) 30-VI-1996 (1)

sp. 18
Meliosma rigida (Sabl) 30-VI-1996 (1)

sp. 19
Litsea japonica (Lau2) 5-X-1996 (1)

sp. 20
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

sp. 21
Schefflera octophylla (Arl2) 10-XII-1996 (1)

sp. 22
Glochidion acuminatum (Eup3) 3-VI-1996 (1)

sp. 23
Vigna marina (Leg5) 7-VIII-1996 (1)

sp. 24
Youngia japonica (Ast9) 18-III-1997 (1)

sp. 25
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 26
Wendlandia formosana (Rub12) 4-VII-1999 (1)

sp. 27
Wendlandia formosana (Rub12) 4-VII-1999 (1)

Ichneumonidae

sp. 1
Mallotus japonicus (Eup7) 3-VI-1996 (1)

sp. 2
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

sp. 3
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 4
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

sp. 5
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

sp. 6
Melastoma candidum (Mel3) 30-VI-1996 (1)

sp. 7
Clematis terniflora (Ran2) 7-V-1997 (1)

sp. 8
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 9
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (6)

sp. 10
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 11
Deutzia naseana (Hyd1) 18-III-1997 (1)

sp. 12
Trema orientalis (Ulm1) 31-V-1999 (1)

sp. 13
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 14
Castanopsis sieboldii subsp. *leutchuensis* (*Fag1*) *16-IV-1995* (*3*); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

sp. 15
Deutzia naseana (Hyd1) 16-IV-1995 (1)

sp. 16
Callicarpa japonica var. *luxurians* (Ver1) 7-VIII-1996 (1)

Diapriidae

sp.
Glochidion obovatum (Eup4) 4-VII-1999 (1)

Chalcididae

sp.
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

Pteromalidae

sp. 1
Glochidion acuminatum (Eup3) 3-VI-1996 (1)

sp. 2
Ilex integra (Aqu1) 3-VI-1996 (1)

sp. 3
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

sp. 4
Euscaphis japonica (Sta1) 16-IV-1995 (1)

sp. 5
Schefflera octophylla (Ari2) 10-XII-1996 (1)

sp. 6
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 7
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 18-III-1997 (1)

sp. 8
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 9
Ilex integra (Aqul) 3-VI-1996 (1)

sp. 10
Meliosma rigida (Sabl) 30-VI-1996 (2)

sp. 11
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 18-III-1997 (1)

sp. 12
Antidesma japonicum (Eupl) 31-V-1999 (1)

sp. 13
Glochidion acuminatum (Eup3) 7-V-1997 (1)

Encyrtidae

sp. 1
Meliosma rigida (Sabl) 30-VI-1996 (1); *Heritiera littoralis* (Stel) 3-VI-1996 (1); *Glochidion acuminatum* (Eup3) 3-VI-1996 (2), 31-V-1999 (1), 7-V-1997 (7); *Mallotus japonicus* (Eup7) 3-VI-1996 (1)

sp. 2
Meliosma rigida (Sabl) 30-VI-1996 (1)

Elasmidae

sp.
Meliosma rigida (Sabl) 30-VI-1996 (1)

Eulophidae

sp. 1
Deutzia naseana (Hydl) 16-IV-1995 (1)

sp. 2
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 3
Securinega suffruticosa var. *amamiense* (Eup8) 31-V-1999 (3)

sp. 4
Ilex integra (Aqul) 3-VI-1996 (1)

sp. 5
Callicarpa japonica var. *luxurians* (Verl) 7-VIII-1996 (1)

sp. 6
Antidesma japonicum (Eupl) 31-V-1999 (1)

sp. 7
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 8
Maesa tenera (Myr4) 18-III-1997 (1)

sp. 9
Meliosma rigida (Sabl) 30-VI-1996 (1)

Cynipidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

sp. 2
Ligustrum japonicum (Olel) 30-VI-1996 (1)

Scoliidae

Carinosolia melanosoma fascinata
Ampelopsis brevipedunculata var. *glabrifolia* (Vitl) 7-VIII-1996 (2); *Dendropanax trifidus* (Arll) 7-VIII-1996 (1); *Premna corymbosa* var. *obtusifolia* (Ver4) 7-VIII-1996 (3)

Scolia kuroiwai?
Glochidion zeylanicum (Eup5) 30-VI-1996 (1)

Campsomeris testaceipes
Schefflera octophylla (Arl2) 7-VIII-1996 (2)

Formicidae

Ochetelus itoi
Schefflera octophylla (Arl2) 10-XII-1996 (3)

Technomyrmex albipes
Symplocos microcalyx (Sym3) 16-IV-1995 (1); *Lagerstroemia subcostata* (Lytl) 4-VII-1999 (1); *Ligustrum japonicum* (Olel) 30-VI-1996 (1); *Wendlandia formosana* (Rubl2) 4-VII-1999 (1)

Pristomyrmex pungeus
Trema orientalis (Ulml) 31-V-1999 (1);

Paratrechina flavipes
Glochidion acuminatum (Eup3) 3-VI-1996 (1)

Tetramonium bicarinatum
Lasianthus japonicus (Rub3) 12-XII-1997 (2)

Anoplolepis longipes
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 1
Lysimachia mauritiana (Pril) 18-III-1997 (2); *Peucedanum japonicum* (Apil) 18-III-1997 (1); *Youngia japonica* (Ast9) 18-III-1997 (4)

Eumeneidae

Antherhynchium flavomarginatum
Ampelopsis brevipedunculata var. *glabrifolia* (Vitl) 3-VI-1996 (5); *Schima wallichii* (Thel) 3-VI-1996 (1)

Stenodynerus kushigemati tsunekii
Ardisia sieboldii (Myr3) 31-V-1999 (1)

Okinawepipona kogimai nagasei
Ardisia quinquegona (Myr2) 30-VI-1996 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 3-VI-1996 (1); *Maackia tashiroi* (Leg7) 4-VII-1999 (1)

Vespidae

Vespa analis eisa
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Schima wallichii* (The1) 3-VI-1996 (3); *Heritiera littoralis* (Ste1) 3-VI-1996 (2); *Lagerstroemia subcostata* (Lyt1) 4-VII-1999 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 3-VI-1996 (3); *Euodia meliifolia* (Rut1) 5-X-1996 (2); *Dendropanax trifidus* (Ari1) 7-VIII-1996 (2); *Premna corymbosa* var. *obtusifolia* (Ver4) 7-VIII-1996 (1); *Psychotria homalosperma* (Rub7) 7-VIII-1996 (2); *Musa balbisiana* (Mus1) 7-VIII-1996 (1)

Vespula shidai amamiana
Heritiera littoralis (Ste1) 3-VI-1996 (2); *Styrax japonica* (Sty1) 17-II-1999 (1); *Glochidion acuminatum* (Eup3) 31-V-1999(1); *Psychotria homalosperma* (Rub7) 4-VII-1999 (1)

Polistes rothneyi iwatai
Rhamnella franguloides var. *inaequilatera* (Rha1) 30-VI-1996 (1)

Polistes japonicus japonicus
Vigna marina (Leg5) 7-VIII-1996 (1)

Sphecidae

Isodontia nigella
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 3-VI-1996 (2)

Tachysphex japonicus
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

Ectemnius confinis?
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

Cerceris yuwanensis
Premna microphylla (Ver6) 7-V-1997 (3)

Tachytes? sp.
Heritiera littoralis (Ste1) 3-VI-1996 (1)

Colletidae

Colletes perforator
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (8), 12-XII-1997 (6); *Farfugium japonicum* (Ast6) 10-XII-1996 (2)

Hylaeus insularum
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Meliosma rigida* (Sab1) 30-VI-1996 (28); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (2); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 30-VI-1996 (6); *Vigna marina* (Leg5) 7-VIII-1996 (1); *Lagerstroemia subcostata* (Lyt1) 4-VII-1999 (1), 7-VIII-1996 (7); *Mallotus japonicus* (Eup7) 3-VI-1996 (4); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (6); *Euodia meliifolia* (Rut1) 5-X-1996 (2); *Dendropanax trifidus* (Ari1) 7-VIII-1996 (1); *Callicarpa japonica* var. *luxurians* (Ver1) 7-VIII-1996 (3); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 5-X-1996 (1), 7-VIII-1996 (1); *Premna microphylla* (Ver6) 7-V-1997 (1); *Ligustrum japonicum* (Ole1) 30-VI-1996 (1); *Wendlandia formosana* (Rub12) 30-VI-1996 (1)

Halictidae

Lasioglossum nutilum
Cinnamomum doederleinii (Laul) 3-VI-1996 (2); *Clematis terniflora* (Ran2) 7-V-1997 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (4); *Peucedanum japonicum* (Api1) 31-V-1999 (11)

Lasioglossum sp. 1
Pittosporum tobira (Pit1) 18-III-1997 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (2)

Lasioglossum sp. 2
Sedum formosanum (Cra1) 7-V-1997 (2); *Lagerstroemia subcostata* (Lyt1) 4-VII-1999 (1); *Youngia japonica* (Ast9) 18-III-1997 (1)

Lasioglossum subopacum
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (19); *Reynoutria japonica* (Pol2) 5-X-1996 (2); *Ardisia pusilla* (Myr1) 30-VI-1996 (1); *Bredia hirsuta* (Mel2) 5-X-1996 (2); *Melastoma candidum* (Mel3) 4-VII-1999 (1); *Psychotria sepens* (Rub8) 30-VI-1996 (2); *Ageratum houstonianum* (Ast7) 5-X-1996 (2); *Alocasia odora* (Ara1) 30-VI-1996 (1); *Pollia japonica* var. *minor* (Com1) 30-VI-1996 (1)

Lasioglossum amamiensis
Clematis grata var. *ryukyuensis* (Ran1) 5-X-1996 (1); *Sedum formosanum* (Cra1) 7-V-1997 (1); *Glochidion zeylanicum* (Eup5) 26-V-1998 (1)

Lasioglossum sp. 4
Crepidiastrum lanceolatum (Ast4) 12-XII-1997 (3)

Nomia pavonula
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (3); *Melastoma candidum* (Mel3) 4-VII-1999 (3)

Andrenidae

Andrena opacifovea
Elaeocarpus japonicus (Ela1) 16-IV-1995 (4); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); 18-III-1997 (6)

Andrena edashigei
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (3); *Deutzia naseana* (Hyd1) 16-IV-1995 (14)

Andrena knuthi
Elaeocarpus japonicus (Ela1) 16-IV-1995 (3); *Youngia japonica* (Ast9) 18-III-1997 (6)

Andrena amamiensis
Symplocos microcalyx (Sym3) 16-IV-1995 (3); *Deutzia naseana* (Hyd1) 16-IV-1995 (14)

Andrena hirashimai
Elaeocarpus japonicus (Ela1) 16-IV-1995 (2)

Andrena esakii
Styrax japonica (Sty1) 17-II-1999 (2)

Megachilidae

Lithurge collaris
Hibiscus hamabo (Mal1) 30-VI-1996 (2); *Hibiscus tiliaceus* (Mal3) 30-VI-1996 (2), 4-VII-1999 (2); *Vitex rotundifolia* (Ver5) 7-VIII-1996 (1)

Megachile okinawana
Canavalia lineata (Leg3) 7-VIII-1996 (1); *Vigna marina* (Leg5) 7-VIII-1996 (1); *Scaevola frutescens* (Goo1) 7-VIII-1996 (1); *Wedelia biflora* (Ast8) 30-VI-1996 (1)

Megachile nipponica amamiensis
Schima wallichii (The1) 4-VII-1999 (1)

Chalicodoma sculpturalis
Maackia tashiroi (Leg7) 4-VII-1999 (1); *Ormocarpum cochinchinense* (Leg8) 4-VII-1999 (1)

Chalicodoma disjunctiformis
Maackia tashiroi (Leg7) 4-VII-1999 (5)

Anthophoridae

Tetralonia okinawae okinawae
Viola pseudo-japonica (Vio1) 18-III-1997 (1); *Vaccinium wrightii* (Eri2) 7-V-1997 (1); *Rhododendron tashiroi* (Eri3) 18-III-1997 (1); *Styrax japonica* (Sty1) 16-IV-1995 (1), 18-III-1997 (1); *Pittosporum tobira* (Pit1) 16-IV-1995 (4), 18-III-1997 (3); *Deutzia naseana* (Hyd1) 16-IV-1995 (1); *Rhaphiolepis indica* var. *umbellata* (Ros1) 16-IV-1995 (4); *Rubus sieboldii* (Ros2) 16-IV-1995 (1), 18-III-1997 (1); *Ipomoea indica* (Con1) 18-III-1997 (1); *Ajuga dictyocarpa* (Lab2) 18-III-1997 (2); *Wedelia biflora* (Ast8) 18-III-1997 (1)

Amegilla dulcifera subflavescens
Hibiscus makinoi (Mal2) 5-X-1996 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Melastoma candidum* (Mel3) 30-VI-1996 (1), 4-VII-1999 (1); *Kandelia candel* (Rhi1) 7-VIII-1996 (4); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1); *Scaevola frutescens* (Goo1) 7-VIII-1996 (2); *Alpinia formosana* (Zin1) 30-VI-1996 (1); *Alpinia intermedia* (Zin2) 30-VI-1996 (3); *Alpinia speciosa* (Zin3) 30-VI-1996 (2)

Ceratina satoi
Vigna marina (Leg5) 30-VI-1996 (1); *Vitex rotundifolia* (Ver5) 7-VIII-1996 (3)

Ceratina okinawana
Vitex rotundifolia (Ver5) 7-VIII-1996 (1)

Xylocopa amamensis
Schima wallichii (The1) 3-VI-1996 (1); *Actinidia rufa* (Act1) 16-IV-1995 (1); *Hibiscus makinoi* (Mal2) 5-X-1996 (2); *Vaccinium wrightii* (Eri2) 16-IV-1995 (1); *Diospyrus japonica* (Ebe1) 3-VI-1996 (5); *Styrax japonica* (Sty1) 16-IV-1995 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (2); *Ardisia sieboldii* (Myr3) 30-VI-1996 (1), 4-VII-1999 (3); *Canavalia lineata* (Leg3) 7-VIII-1996 (1); *Maackia tashiroi* (Leg7) 4-VII-1999 (1); *Kandelia candel* (Rhi1) 7-VIII-1996 (6); *Ilex integra* (Aqu1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (3); *Euodia meliifolia* (Rut1) 5-X-1996 (5); *Dendropanax trifidus* (Arl1) 7-VIII-1996 (1); *Cerbera manghas* (Apo1) 7-VIII-1996 (3); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1); *Vitex rotundifolia* (Ver5) 7-VIII-1996 (2); *Premna microphylla* (Ver6) 7-V-1997 (3); *Scaevola frutescens* (Goo1) 7-VIII-1996 (2); *Musaenda parviflora* (Rub5) 3-VI-1996 (1); *Alpinia formosana* (Zin1) 30-VI-1996 (1)

Apidae

Apis cerana
Heritiera littoralis (Ste1) 3-VI-1996 (1); *Rubus croceacanthus* (Ros3) 17-II-1999 (3); *Crepidiastrum lanceolatum* (Ast4) 12-XII-1997 (4)

Apis mellifera
Brassica campestris (Bra1) 18-III-1997 (1); *Crepidiastrum lanceolatum* (Ast4) 10-XII-1996 (1)

DIPTERA

Tipulidae

sp. 1
Rubus sieboldii (Ros2) 16-IV-1995 (1)

Tanyptera sp.
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 2
Glochidion zeylanicum (Eup5) 26-V-1998 (1)

sp. 3
Croomia japonica (Stm1) 31-V-1999 (1)

Culicidae

Toxorhynchites manicans yamadai
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

sp. 2
Reynoutria japonica (Pol2) 5-X-1996 (1)

sp. 3
Croomia japonica (Stm1) 31-V-1999 (1)

sp. 4
Machilus thunbergii (Lau4) 18-III-1997 (1)

Ceratopogonidae

sp. 1
Machilus thunbergii (Lau4) 18-III-1997 (1)

sp. 2
Antidesma japonicum (Eup1) 31-V-1999 (1)

sp. 3
Styrax japonica (Sty1) 17-II-1999 (1)

sp. 4
Antidesma japonicum (Eup1) 31-V-1999 (3)

sp. 5
Machilus thunbergii (Lau4) 18-III-1997 (1)

Chironomidae

sp. 1
Antidesma japonicum (Eup1) 31-V-1999 (1)

sp. 2
Litsea japonica (Lau2) 5-X-1996 (1); *Schefflera octophylla* (Arl2) 10-XII-1996 (1)

Cecidomyiidae

sp. 1
Musaenda parviflora (Rub5) 3-VI-1996 (1)

sp. 2
Antidesma japonicum (Eup1) 31-V-1999 (1)

Mycetophilidae

sp. 1
Machilus thunbergii (Lau4) 18-III-1997 (1)

sp. 2
Croomia japonica (Stm1) 31-V-1999 (1)

Scialidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (3); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Antidesma japonicum* (Eup1) 31-V-1999 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (1)

sp. 2
Machilus thunbergii (Lau4) 18-III-1997 (4); *Glochidion acuminatum* (Eup3) 31-V-1999 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1); *Schefflera octophylla* (Ari2) 10-XII-1996 (1)

sp. 3
Meliosma rigida (Sab1) 30-VI-1996 (1)

sp. 4
Machilus thunbergii (Lau4) 18-III-1997 (1); *Clematis terniflora* (Ran2) 7-V-1997 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (2)

sp. 5
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 6
Maesa tenera (Myr4) 18-III-1997 (1); *Aster asa-grayi* (Ast11) 18-III-1997 (1)

sp. 7
Glochidion acuminatum (Eup3) 31-V-1999 (1), 7-V-1997 (2)

Psychodidae

sp. 1
Litsea japonica (Lau2) 5-X-1996 (1)

sp. 1
Glochidion acuminatum (Eup3) 31-V-1999 (1)

Bibionidae

Bibio sp.
Pinus luchuensis (Pin1) 18-III-1997 (1)

Stratiomyidae

Microchrysa flaviventris
Ilex integra (Aqu1) 3-VI-1996 (1)

Cephalochrysa sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Tabanidae

Atylotus sawadai?
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

Bombyliidae

Hyperalonia tantalus
Rhamnella franguloides var. *inaequilatera* (Rhal) 30-VI-1996 (1)

Bombylius major
Styrax japonica (Styl) 17-II-1999 (1); *Bidens pilosa* var. *radiata* (Astl0) 18-III-1997 (1)

Asilidae

Philonicus sp.
Euscaphis japonica (Stal) 16-IV-1995 (1)

Leptogaster augusta?
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (1)

Empididae

sp. 1
Schefflera octophylla (Arl2) 10-XII-1996 (1)

sp. 2
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1); *Myrsine seguinii* (Myr5) 16-IV-1995 (1)

sp. 3
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 3
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

sp. 4
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (2); *Symplocos microcalyx* (Sym3) 16-IV-1995 (2); *Euscaphis japonica* (Stal) 16-IV-1995 (1)

sp. 5
Machilus thunbergii (Lau4) 18-III-1997 (5); *Castanopsis sieboldii* subsp. *leutchuensis* (Fagl) 18-III-1997 (1); *Maesa tenera* (Myr4) 18-III-1997 (8)

sp. 6
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 18-III-1997 (1)

sp. 7
Machilus thunbergii (Lau4) 18-III-1997 (1); *Symplocos microcalyx* (Sym3) 18-III-1997 (3)

sp. 8
Maesa tenera (Myr4) 18-III-1997 (1)

sp. 9
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 18-III-1997 (1)

sp. 10
Cinnamomum doederleinii (Laul) 18-III-1997 (1)

sp. 11
Machilus thunbergii (Lau4) 18-III-1997 (1)

sp. 12
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 13
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 14
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 15
Peucedanum japonicum (Api1) 18-III-1997 (1)

sp. 16
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 17
Styrax japonica (Sty1) 17-II-1999 (1)

Anomalempis sp.
Piper kadzura (Pip1) 7-V-1997 (1); *Clematis terniflora* (Ran2) 3-VI-1996 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 18-III-1997 (1); *Styrax japonica* (Sty1) 17-II-1999 (2); *Maesa tenera* (Myr4) 18-III-1997 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1), 7-V-1997 (1)

sp. 19
Symplocos microcalyx (Sym3) 18-III-1997 (1)

sp. 20
Styrax japonica (Sty1) 17-II-1999 (1)

Dolicopodidae

sp. 1
Styrax japonica (Sty1) 18-III-1997 (1); *Peucedanum japonicum* (Api1) 31-V-1999 (1); *Ajuga dictyocarpa* (Lab2) 16-IV-1995(1)

sp. 2
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

Phoridae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 2
Ajuga dictyocarpa (Lab2) 16-IV-1995 (1)

sp. 3
Maesa tenera (Myr4) 18-III-1997 (2)

sp. 4
Peucedanum japonicum (Api1) 18-III-1997 (1)

Syrphidae

Phytomia zonata
Schima wallichii (Thel) 3-VI-1996 (4); *Elaeocarpus sylvestris* var. *ellipticus* (Ela2) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (2); *Peucedanum japonicum* (Api1) 31-V-1999 (2); *Wendlandia formosana* (Rub12) 4-VII-1999 (2)

Eristalis tenax
Schima wallichii (Thel) 3-VI-1996 (5); *Mallotus japonicus* (Eup7) 3-VI-1996 (2)

Eristalinus arvorum?
Ilex integra (Aqu1) 3-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (4)

Eristalinus quinquestriatum
Ardisia sieboldii (Myr3) 31-V-1999 (1); *Schefflera octophylla* (Arl2) 10-XII-1996 (1)

Ischirosyrphus sp.
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

Parasyrphus aeneostoma
Machilus thunbergii (Lau4) 18-III-1997 (1)

Chalcosyrphus annulipes
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Allobaccha nubilipennis
Piper kadzura (Pip1) 7-V-1997 (1); *Reynoutria japonica* (Pol2) 5-X-1996 (1); *Blastus cochinchinensis* (Mel1) 7-VIII-1996 (1); *Bredia hirsuta* (Mel2) 5-X-1996 (2); *Glochidion zeylanicum* (Eup5) 26-V-1998 (1); *Rhynchotechum discolor* (Ges1) 7-VIII-1996 (2)

Cheilosia sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1); *Maesa tenera* (Myr4) 18-III-1997 (1)

Episyrphus balteata
Styrax japonica (Sty1) 17-II-1999 (2); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Lysimachia mauritiana* (Pri1) 18-III-1997 (1); *Deutzia naseana* (Hyd1) 16-IV-1995 (2); *Mosla dianthera* (Lab1) 5-X-1996 (1); *Aeginetia indica* (Oro1) 5-X-1996 (1); *Crepidiastrum lanceolatum* (Ast4) 10-XII-1996 (2); *Farfugium japonicum* (Ast6) 10-XII-1996 (1)

Asarkina porcina
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (2); *Ligustrum japonicum* (Ole1) 30-VI-1996 (1)

Chrysotoxum testaceum
Salsola komarovii (Che1) 10-XII-1996 (1); *Lysimachia mauritiana* (Pri1) 18-III-1997 (1); *Crepidiastrum lanceolatum* (Ast4) 10-XII-1996 (2), 12-XII-1997 (1)

Eumerus okinawaensis
Ranunculus sieboldii (Ran3) 31-V-1999 (1), 5-X-1996 (1); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (2); *Deutzia naseana* (Hyd1) 16-IV-1995 (1); *Rubus grayanus* (Ros4) 18-III-1997 (1); *Lagerstroemia subcostata* (Lyt1) 4-VII-1999 (1); *Melastoma candidum* (Mel3) 4-VII-1999 (5); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (1); *Aeginetia indica* (Oro1) 5-X-1996 (1); *Wendlandia formosana* (Rub12) 30-VI-1996 (1), 4-VII-1999 (1)

Allograpta javania
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (11); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (5); *Schefflera octophylla* (Ari2) 10-XII-1996 (4), 12-XII-1997 (2)

Eupeodes corollae
Youngia japonica (Ast9) 18-III-1997 (3)

Asarkina ericetorum
Crepidiastrum lanceolatum (Ast4) 12-XII-1997 (1)

Milesia oshimaensis
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1); *Psychotria sepens* (Rub8) 4-VII-1999 (1)

Didea alneti
Schima wallichii (The1) 4-VII-1999 (1)

Xylota annulata
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Xylota coquilletti amamiensis
Glochidion acuminatum (Eup3) 31-V-1999 (1)

Cheilosia sp.?
Crepidiastrum lanceolatum (Ast4) 12-XII-1997 (1)

Eristalinus viridis
Lagerstroemia subcostata (Lyt1) 4-VII-1999 (1)

Tephritidae

Paraoxyna bidentis
Mosla dianthera (Lab1) 5-X-1996 (7); *Youngia japonica* (Ast9) 18-III-1997 (1)

Ensina sonchi
Youngia japonica (Ast9) 18-III-1997 (1)

Dioxyna sororcula
Cinnamomum doederleinii (Lau1) 3-VI-1996 (3); *Meliosma rigida* (Sab1) 30-VI-1996 (2); *Persicaria chinensis* (Pol1) 10-XII-1996 (1); *Glochidion acuminatum* (Eup3) 3-VI-1996 (2); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (2); *Crepidiastrum lanceolatum* (Ast4) 10-XII-1996 (1)

Scedella formosella
Vitex rotundifolia (Ver5) 7-VIII-1996 (1)

Anomia sp. 1
Schefflera octophylla (Ari2) 10-XII-1996 (2), 12-XII-1997 (2)

Anomia sp. 2
Mallotus japonicus (Eup7) 3-VI-1996 (1)

Philophyla superflucta
Heritiera littoralis (Ste1) 3-VI-1996 (1)

Sphenella sinensis
Glochidion acuminatum (Eup3) 3-VI-1996 (1); *Youngia japonica* (Ast9) 18-III-1997 (1)

Elaphromyia imcompleta
Pinus luchuensis (Pin1) 18-III-1997 (1)

Platystomatidae

Senopterina sp.
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

Otitidae

Stictomyia sp.
Persicaria chinensis (Pol1) 10-XII-1996 (1)

Lauxaniidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996(2); *Ligustrum japonicum* (Ole1) 30-VI-1996 (2)

sp. 2
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 3
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Brassica campestris* (Bra1) 18-III-1997 (1)

sp. 4
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Brassica campestris* (Bra1) 18-III-1997 (1); *Glochidion acuminatum* (Eup3) 7-V-1997 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (2); *Securinega suffruticosa* var. *amamiense* (Eup8) 31-V-1999 (2); *Schefflera octophylla* (Arl2) 10-XII-1996 (1); *Peucedanum japonicum* (Api1) 31-V-1999 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

sp. 5
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (2)

sp. 6
Meliosma rigida (Sab1) 30-VI-1996 (1)

sp. 7
Meliosma rigida (Sab1) 30-VI-1996 (2)

sp. 8
Elaeocarpus sylvestris var. *ellipticus* (Ela2) 30-VI-1996 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1); *Schefflera octophylla* (Arl2) 10-XII-1996 (1)

sp. 9
Rhamnella franguloides var. *inaequilatera* (Rha1) 30-VI-1996 (1)

sp. 10
Rhamnella franguloides var. *inaequilatera* (Rha1) 30-VI-1996 (2); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996(1)

sp. 11
Schima wallichii (The1) 3-VI-1996 (1)

sp. 12
Glochidion acuminatum (Eup3) 31-V-1999 (2)

sp. 12
Glochidion acuminatum (Eup3) 31-V-1999 (2)

sp. 13
Peucedanum japonicum (Api1) 31-V-1999 (1)

sp. 14
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 15
Trema orientalis (Ulm1) 31-V-1999 (1)

sp. 16
Stauntonia hexaphylla (Lar1) 18-III-1997 (1)

sp. 17
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 18
Wendlandia formosana (Rub12) 4-VII-1999 (1)

sp. 19
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 20
Glochidion obovatum (Eup4) 4-VII-1999 (1)

sp. 21
Stauntonia hexaphylla (Lar1) 18-III-1997 (1)

sp. 22
Glochidion zeylanicum (Eup5) 26-V-1998 (1)

sp. 23
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 24
Glochidion acuminatum (Eup3) 31-V-1999 (1); *Glochidion zeylanicum* (Eup5) 26-V-1998 (1)

Milichiidae

Mediza sp.
Schima wallichii (The1) 3-VI-1996 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

Desmometopa sp.
Dendropanax trifidus (Arl1) 7-VIII-1996 (1)

Chloropidae

sp. 1
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (2)

sp. 2
Meliosma rigida (Sab1) 30-VI-1996 (3)

sp. 3
Meliosma rigida (Sab1) 30-VI-1996 (1); *Glochidion zeylanicum* (Eup5) 30-VI-1996 (1)

sp. 4
Meliosma rigida (Sabl) 30-VI-1996 (1)

sp. 5
Meliosma rigida (Sabl) 30-VI-1996 (1); *Elaeocarpus japonicus* (Elal) 16-IV-1995 (5); *Symplocos microcalyx* (Sym3) 16-IV-1995 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 6
Dendropanax trifidus (Arl1) 7-VIII-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (4)

sp. 7
Litsea japonica (Lau2) 5-X-1996 (3)

sp. 8
Litsea japonica (Lau2) 5-X-1996 (1); *Meliosma rigida* (Sabl) 30-VI-1996 (3); *Castanopsis sieboldii* subsp. *leutchuensis* (Fagl) 16-IV-1995 (1); *Symplocos microcalyx* (Sym3) 16-IV-1995 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Dendropanax trifidus* (Arl1) 7-VIII-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 9
Litsea japonica (Lau2) 5-X-1996 (5)

sp. 10
Mallotus japonicus (Eup7) 3-VI-1996 (1)

sp. 11
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 12
Meliosma rigida (Sabl) 30-VI-1996 (1)

sp. 13
Meliosma rigida (Sabl) 30-VI-1996 (1)

sp. 14
Musaenda parviflora (Rub5) 3-VI-1996 (1)

sp. 15
Ardisia quinquegona (Myr2) 30-VI-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 16
Mallotus japonicus (Eup7) 3-VI-1996 (1)

sp. 17
Schima wallichii (Thel) 3-VI-1996 (1)

sp. 18
Schima wallichii (Thel) 3-VI-1996 (1); *Heritiera littoralis* (Stel) 3-VI-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (2)

sp. 19
Elaeocarpus japonicus (Elal) 16-IV-1995 (1)

Siphunculina sp.
Piper kadzura (Pip1) 7-V-1997 (1); *Meliosma rigida* (Sab1) 30-VI-1996 (9); *Heritiera littoralis* (Ste1) 3-VI-1996 (1); *Symplocos microcalyx* (Sym3) 16-IV-1995 (2); *Glochidion obovatum* (Eup4) 31-V-1999 (3); *Mallotus japonicus* (Eup7) 3-VI-1996 (1); *Musaenda parviflora* (Rub5) 3-VI-1996 (3)

sp. 21
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

sp. 22
Meliosma rigida (Sab1) 30-VI-1996 (1)

Ephydridae

sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

Drosophilidae

sp. 1
Litsea japonica (Lau2) 5-X-1996 (1); *Ardisia sieboldii* (Myr3) 31-V-1999 (1); *Maesa tenera* (Myr4) 18-III-1997 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

sp. 2
Musaenda parviflora (Rub5) 3-VI-1996 (1)

sp. 3
Machilus thunbergii (Lau4) 18-III-1997 (1); *Bredia hirsuta* (Mel2) 5-X-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1)

sp. 4
Heritiera littoralis (Ste1) 3-VI-1996 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

sp. 5
Alpinia speciosa (Zin3) 30-VI-1996 (3)

sp. 6
Meliosma rigida (Sab1) 30-VI-1996 (1); *Styrax japonica* (Sty1) 17-II-1999 (1); *Maesa tenera* (Myr4) 18-III-1997 (1); *Glochidion acuminatum* (Eup3) 31-V-1999 (1)

sp. 7
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (1)

sp. 8
Alpinia speciosa (Zin3) 30-VI-1996 (1)

sp. 9
Machilus thunbergii (Lau4) 18-III-1997 (5); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1); *Acer insulae* (Ace1) 18-III-1997(1)

sp. 10
Symplocos microcalyx (Sym3) 16-IV-1995 (1)

sp. 11
Euscaphis japonica (Sta1) 16-IV-1995 (1)

sp. 12
Machilus thunbergii (Lau4) 18-III-1997 (2); *Antidesma japonicum* (Eup1) 31-V-1999 (1);

Glochidion zeylanicum (Eup5) 26-V-1998 (1); *Croomia japonica* (Stm1) 31-V-1999 (1)

sp. 13
Litsea citriodora (Lau3) 18-III-1997 (1); *Machilus thunbergii* (Lau4) 18-III-1997 (1); *Acer insulae* (Ace1) 18-III-1997 (1)

sp. 14
Wendlandia formosana (Rub12) 4-VII-1999 (1)

sp. 15
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

sp. 16
Litsea japonica (Lau2) 5-X-1996 (1); *Bredia hirsuta* (Mel2) 5-X-1996 (1); *Mosla dianthera* (Lab1) 5-X-1996 (3)

sp. 17
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 18
Peucedanum japonicum (Api1) 31-V-1999 (1)

sp. 19
Peucedanum japonicum (Api1) 18-III-1997 (1), 31-V-1999 (1)

Colocasiomyia alocasiae
Alocasia odora (Ara1) 30-VI-1996 (8)

Colocasiomyia xenalocasiae
Alocasia odora (Ara1) 30-VI-1996 (1)

Sphaeroceridae

sp.
Antidesma japonicum (Eup1) 31-V-1999 (3)

Anthomyiidae

sp.
Persicaria chinensis (Pol1) 10-XII-1996 (1)

Muscidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 2
Farfugium japonicum (Ast6) 10-XII-1996 (1)

sp. 3
Deutzia naseana (Hyd1) 16-IV-1995 (1); *Antidesma japonicum* (Eup1) 31-V-1999 (2)

sp. 4
Glochidion acuminatum (Eup3) 7-V-1997 (1)

sp. 5
Crepidiastrum lanceolatum (Ast4) 10-XII-1996 (1)

sp. 6
Meliosma rigida (Sabl) 30-VI-1996 (2)

sp. 7
Aeginetia indica (Orol) 5-X-1996 (1); *Croomia japonica* (Stml) 31-V-1999 (1)

sp. 8
Elaeocarpus japonicus (Elal) 16-IV-1995 (1)

sp. 9
Trema orientalis (Ulml) 31-V-1999 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vitl) 7-VIII-1996 (1)

sp. 10
Scaevola frutescens (Gool) 7-VIII-1996 (1)

sp. 11
Dendropanax trifidus (Arll) 7-VIII-1996 (1)

sp. 12
Youngia japonica (Ast9) 18-III-1997 (1)

sp. 13
Acer insulae (Acel) 18-III-1997 (1)

sp. 14
Styrax japonica (Styl) 17-II-1999 (2)

sp. 15
Maesa tenera (Myr4) 18-III-1997 (1)

sp. 16
Wendlandia formosana (Rubl2) 4-VII-1999 (1)

sp. 17
Glochidion acuminatum (Eup3) 31-V-1999 (1); *Schefflera octophylla* (Arl2) 10-XII-1996 (1)

sp. 18
Elaeocarpus japonicus (Elal) 16-IV-1995 (1)

sp. 19
Scaevola frutescens (Gool) 7-VIII-1996 (1)

sp. 20
Schefflera octophylla (Arl2) 10-XII-1996 (2)

Ophyra leucostoma
Castanopsis sieboldii subsp. *leutchuensis* (Fagl) 16-IV-1995 (1)

sp. 22
Antidesma japonicum (Eupl) 31-V-1999 (2)

sp. 23
Maesa tenera (Myr4) 18-III-1997 (1)

sp. 24
Machilus thunbergii (Lau4) 18-III-1997 (1)

Calliphoridae

Stomorhina obsoleta
Cinnamomum doederleinii (Lau1) 3-VI-1996 (2); *Clematis terniflora* (Ran2) 3-VI-1996 (2), 7-V-1997 (2); *Castanopsis sieboldii* subsp. *leutchuensis* (Fag1) 16-IV-1995 (1), 18-III-1997 (2); *Schima wallichii* (The1) 3-VI-1996 (12), 31-V-1999 (4), 4-VII-1999 (2); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (3); *Brassica campestris* (Bra1) 18-III-1997 (8); *Diospyrus japonica* (Ebe1) 3-VI-1996 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (2); *Ardisia sieboldii* (Myr3) 31-V-1999 (1), 4-VII-1999 (2); *Lysimachia mauritiana* (Pri1) 18-III-1997 (3); *Lagerstroemia subcostata* (Lyt1) 4-VII-1999(7), 7-VIII-1996 (5); *Kandelia candel* (Rhi1) 7-VIII-1996 (1); *Ilex integra* (Aqu1) 3-VI-1996 (17); *Mallotus japonicus* (Eup7) 3-VI-1996 (53); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996 (2); *Euodia meliifolia* (Rut1) 5-X-1996(1); *Dendropanax trifidus* (Ari1) 7-VIII-1996 (1); *Schefflera octophylla* (Ari2) 10-XII-1996 (4), 12-XII-1997 (1), 7-VIII-1996 (1); *Peucedanum japonicum* (Api1) 31-V-1999 (6); *Callicarpa japonica* var. *luxurians* (Ver1) 7-VIII-1996 (5); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 7-VIII-1996 (5); *Ligustrum japonicum* (Ole1) 30-VI-1996 (1); *Scaevola frutescens* (Goo1) 7-VIII-1996 (2); *Wendlandia formosana* (Rub12) 30-VI-1996 (5), 4-VII-1999 (4); *Youngia japonica* (Ast9) 18-III-1997 (15)

Chrysomya pinguis
Elaeocarpus japonicus (Ela1) 16-IV-1995 (3); *Rhamnella franguloides* var. *inaequilatera* (Rha1) 30-VI-1996 (1); *Euscaphis japonica* (Sta1) 16-IV-1995 (1); *Schefflera octophylla* (Ari2) 10-XII-1996 (1); *Peucedanum japonicum* (Api1) 31-V-1999 (1)

Chrysomya rufifacies
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 3-VI-1996 (1)

Chrysomya megacephala
Schefflera octophylla (Ari2) 7-VIII-1996 (1); *Peucedanum japonicum* (Api1) 18-III-1997 (1)

Lucilia porphyrina
Heritiera littoralis (Ste1) 3-VI-1996 (1)

Calliphora lata
Cirsium brevicaule (Ast2) 12-XII-1997 (1)

Sarcophagidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1); *Elaeocarpus japonicus* (Ela1) 16-IV-1995 (1)

sp. 2
Persicaria chinensis (Pol1) 10-XII-1996 (1)

sp. 3
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 4
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Tachinidae

sp. 1
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 3-VI-1996 (1)

sp. 2
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 3
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

sp. 4
Euscaphis japonica (Sta1) 16-IV-1995 (1)

sp. 5
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1)

sp. 6
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Crepidiastrum lanceolatum* (Ast4) 12-XII-1997 (2)

sp. 7
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

sp. 8
Schefflera octophylla (Ari2) 10-XII-1996 (1)

sp. 9
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1); *Ageratum houstonianum* (Ast7) 5-X-1996 (1)

sp. 10
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1)

sp. 11
Meliosma rigida (Sab1) 30-VI-1996 (1)

sp. 12
Scaevola frutescens (Goo1) 7-VIII-1996 (1)

sp. 13
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

sp. 14
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 18-III-1997 (1)

sp. 15
Ilex integra (Aqu1) 3-VI-1996 (1)

sp. 16
Premna corymbosa var. *obtusifolia* (Ver4) 7-VIII-1996 (1)

sp. 17
Glochidion obovatum (Eup4) 31-V-1999 (1); *Schefflera octophylla* (Ari2) 12-XII-1997 (1); *Peucedanum japonicum* (Api1) 18-III-1997 (1)

TRICHOPTERA

Hydroptilidae

sp.
Castanopsis sieboldii subsp. *leutchuensis* (Fag1) 16-IV-1995 (1)

Hydropsychidae

Hydropsychoides sp. 1
Kandelia candel (Rhi1) 7-VIII-1996 (1)

Hydropsychoides sp. 2
Machilus thunbergii (Lau4) 18-III-1997 (1)

LEPIDOPTERA

Incurvariidae

Nemophora umbripenis
Cinnamomum doederleinii (Lau1) 3-VI-1996 (1)

Nemophora aurifera
Pittosporum tobira (Pit1) 18-III-1997 (2)

Gracillaridae

sp.
Glochidion zeylanicum (Eup5) 30-VI-1996 (1); *Mallotus japonicus* (Eup7) 3-VI-1996 (4)

Caloptilia sp.
Glochidion zeylanicum (Eup5) 30-VI-1996 (1), 31-V-1999 (2)

Diphtheroptila sp.
Glochidion acuminatum (Eup3) 16-IV-1995 (6)

Choreutidae

Tortyra divitiosa
Premna corymbosa var. *obtusifolia* (Ver4) 7-VIII-1996 (2)

Oecophoridae

sp.
Ilex integra (Aqu1) 3-VI-1996 (1)

Pyralidae

Aethaloessa calidalis
Aeginetia indica (Oro1) 5-X-1996 (1)

Hymenia recurvalis
Hibiscus makinoi (Mal2) 5-X-1996 (1); *Mosla dianthera* (Lab1) 5-X-1996 (1)

Bocchoris inspersalis
Aeginetia indica (Oro1) 5-X-1996 (1)

Conogethes punctiberalis
Kandelia candel (Rhi1) 7-VIII-1996 (1)

Camptomastix hisbonalis
Clerodendrum trichotomum var. *yakusimense* (Ver3) 5-X-1996 (1)

Nacoleia satsumalis
Wendlandia formosana (Rub12) 4-VII-1999 (1)

sp.
Ormocarpum cochinchinense (Leg3) 4-VII-1999 (1)

Hesperiidae

Parnara guttata guttata
Musaenda parviflora (Rub5) 3-VI-1996 (1)

Pelopidas mathias oberthueri
Hibiscus makinoi (Mal2) 5-X-1996 (1)

Choaspes benjaminii japonica
Pittosporum tobira (Pit1) 16-IV-1995 (1); *Wendlandia formosana* (Rub12) 4-VII-1999 (1)

Papilionidae

Papilio helenus nicconicoleus
Schima wallichii (The1) 31-V-1999 (1); *Pittosporum tobira* (Pit1) 16-IV-1995 (1); *Deutzia naseana* (Hyd1) 16-IV-1995 (1)

Papilio bianor amamiensis
Pittosporum tobira (Pit1) 16-IV-1995 (1); *Belamcanda chinensis* (Iri1) 16-IV-1995 (1)

Papilio protenor demetrius
Pittosporum tobira (Pit1) 16-IV-1995 (1)

Papilio memnon thunbergii
Elaeocarpus japonicus (Ela1) 16-IV-1995 (1)

Byasa alcinous loochooana
Dendropanax trifidus (Ari1) 7-VIII-1996 (1); *Schefflera octophylla* (Ari2) 7-VIII-1996 (1)

Graphium sarpedon nipponum
Deutzia naseana (Hyd1) 16-IV-1995 (1); *Schima wallichii* (The1) 31-V-1999 (1); *Pittosporum tobira* (Pit1) 18-III-1997 (2); *Bauhinia japonica* (Leg1) 30-VI-1996 (1); *Musaenda parviflora* (Rub5) 31-V-1999 (4)

Pieridae

Catopsilia pomona
Crepidiastrum lanceolatum (Ast4) 12-XII-1997 (1)

Lycaenidae

Nacaduba kurava septentrionalis
Schima wallichii (The1) 31-V-1999 (1); *Ardisia quinquegona* (Myr2) 30-VI-1996 (1); *Ardisia sieboldii* (Myr3) 30-VI-1996 (1); *Lagerstroemia subcostata* (Lyt1) 7-VIII-1996 (1); *Ampelopsis brevipedunculata* var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

Celastrina argiolus ladonides
Ilex integra (Aqu1) 3-VI-1996 (1)

Danaidae

Parantica sita niphonica
Schima wallichii (The1) 31-V-1999 (1)

Nymphalidae

Vanessa indica
Schima wallichii (The1) 31-V-1999 (1); *Deutzia naseana* (Hyd1) 16-IV-1995 (1)

Geometridae

sp. 1
Glochidion acuminatum (Eup3) 31-V-1999 (1)

sp. 2
Heritiera littoralis (Stel) 31-V-1999 (1)

Sphingidae

Macroglossum saga
Musaenda parviflora (Rub5) 3-VI-1996 (2)

Macroglossum passalus
Clerodendrum trichotomum var. *yakusimense* (Ver3) 7-VIII-1996 (1)

Macroglossum corythus
Hibiscus makinoi (Mal2) 5-X-1996 (3); *Barringtonia racemosa* (Lec1) 7-VIII-1996 (1); *Cerbera manghas* (Apo1) 30-VI-1996 (1); *Clerodendrum trichotomum* var. *yakusimense* (Ver3) 5-X-1996 (2), 7-VIII-1996 (2); *Vitex rotundifolia* (Ver5) 7-VIII-1996(1); *Musaenda parviflora* (Rub5) 31-V-1999 (2)

Arctiidae

Chrisaeglia magnifica
Schima wallichii (The1) 31-V-1999 (1)

Noctuidae

sp. 1
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

sp. 2
Glochidion obovatum (Eup4) 30-VI-1996 (1); *Dendropanax trifidus* (Ari1) 7-VIII-1996 (1)

sp. 3
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

sp. 4
Ampelopsis brevipedunculata var. *glabrifolia* (Vit1) 7-VIII-1996 (1)

Spodoptera litura
Kandelia candel (Rhi1) 7-VIII-1996 (1)

Plate 2. Various vegetation types on Amami Islands

A, D, a *Castanopsis*-dominated forest at Sumiyo where *Castanopsis* canopy trees are mass-flowering in early April; **B,** roadside vegetation near coast at Sesou where *Crepidiastrum* is flowering in January; **C,** a coastal scrub at Kasari-zaki, where *Cycus, Cinammomum* and *Miscanthus* are dominant; **E,** a secondary forest dominated by pines and coastal vegetation dominated by *Hybiscus tiliaceus* along Setouchi Inland Sea at Sesou; **F,** a mangrove forest dominated by *Candelia candel* at Sumiyo; **G.** beach vegetation dominated by *Pandanus* along coral reef at Tsuchihama.

Plate 3. Flowers and pollinators observed on Amami Islands

A, an endemic plant species, *Lagerstroemia subcostata* flowering at Yakkachi; **B,** male fowers of *Mallotus japonicus* visited by a calliphorid fly, *Stomorhina obsoleta* at Nagakumo-toge; **C,** male flowers of *Psychotria homalosperma* visited by a wasp, *Vespula shidai amamiana* at Kinsakubaru; **D,** *Peucedanum japonicum* visited by *S. obsoleta* at Kasari-zaki; **E,** *Hybiscus makinoi* visited by a hawkmoth, *Macroglossum corythus* at Nagakumo-toge; **F,** male and female flowers of *Heritiera littoralis* at Sumiyo; **G,** *Lysimachia mauritiana* visited by a syrphid fly, *Phytomia zonata* at Ayamaru-Misaki; **H,** *Maackia tashiroi* visited by a megachilid bee, *Chalicodoma disjunctiformis* at Akagina; **I,** *Candelia candel* visited by a xylocopine bee, *Xylocopa amamensis* at Sumiyo; **J,** drooping inflorescence of *Barringtonia racemosa* visited by a hawkmoth, *M. corythus* in the evening at Sumiyo; **K,** *Hybiscus tiliaceus visited* by a megachilid bee, *Lithurge collaris* at Akagina; **L-N,** flowers of three ginger species, *Alpinia intermedia, A. formosana* and *A. speciosa* at Sumiyo.


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